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Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

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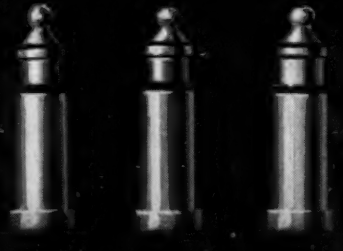

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FLASHES AND PLUGS

COUNTER WISE. A San Francisco, Calif., woman recently received a telephone call from her youngster's school.

Before 7-year-old Stevie could be officially transferred to a new house of learning he must settle his old debts, the teacher said. Which was startling news to the mother.

The teacher explained. Stevie was the only student in the school who had asked for, and received, a charge account at the pie counter. That would be 50 cents, please.

• • •

SEALED LIPS. In Danville, Va., people these days are careful how they talk on the telephone.

One of the residents has been complaining for three months that his radio picks up party-line telephone conversations.

Telephone company technicians have been unable to help; but the company assured the harassed man that "higher level" technicians would be brought in to assist.

Meanwhile, of some of the things he hears, he says, "I dare not repeat."

• • •

VITAL VOCABULARY (2). Ohio Bell Telephone Co.'s employe magazine recently told about a group of the company's linemen who were discussing various phases of their work. To hear them, the article said, some people might have wondered if the dictionary wasn't a bit twisted on its definitions.

In a language all their own, these are some of the words, and their meanings as applied by telephone workers:

IDIOT'S STICK. Nine-foot digging bar, known to laymen as a crowbar.

BEEHIVE. Lamp signals on switchboard to attract attention to calls, a term referring to shape of lamp caps.

PEANUT BURNER. Acetylene torch used to melt metal in splicing operations.

GRASS. Noisy condition on radar screen having appearance of waving grass.

BUTTINSKY. Hand telephone used for testing purposes.

SWEDES. Pliers for cutting and skinning wires, most commonly used tool in telephone business, formerly made by Swedish firm.

DIAPER. Muslin or rubber bandage used as temporary measure to protect incomplete cable splices.

• • •

BOTHERED AND B-LABORED. A business man, telephoning a friend at home, was answered by a child.

"Tell him that Mr. Brown called," he said.

"Wait till I get a pencil and paper," the youngster replied. Then, "How do you spell Brown?"

"B-R-O," the man began. There was a labored silence.

Finally the child asked, "How do you make a 'B'?"

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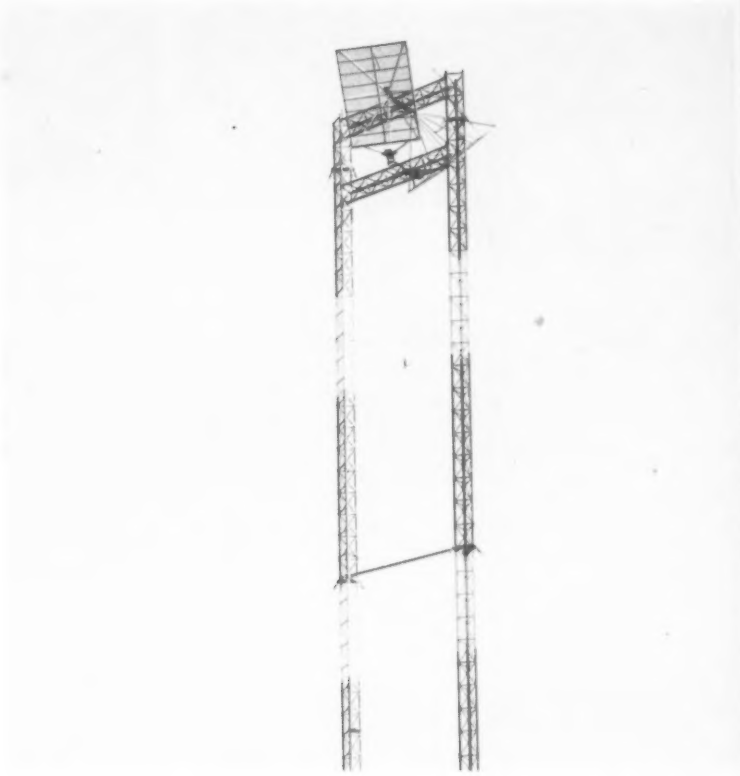
Use of Microwave in the Telephone Field



By Marcus L. Donaldson*

IT HAS NOT BEEN too long ago that many of you heard papers on the use of carriers in telephone communication, and at that time many of you wondered if you could make use of carrier equipment; that is, if you could prove them in money-wise, or if your maintenance staff could handle them; also, if carriers could be used on the type of circuits you had. These problems have been overcome to the point of almost perfection, and the carrier has become a very useful and common thing in your plant today.

I bring out this point so as to make the statement that, even though the use of microwave in telephone communications is new as carriers were just a few years ago, microwave equipment will be more widely used in a shorter time than carriers are now used in your open wire and cable plant, provided we experience the continued growth and the need for additional circuits that we have in the last five years.

We, of the Peninsular Telephone Co., have been considering the use of microwave equipment for several years, and now have in service three links, two television links, and one telephone link.

There are many items to consider in using microwave equipment. I will try to list some of them, trying not to get into the technical side of these questions because this paper is not intended to be technical. Perhaps the best way to do this would be to try to answer some of the many questions that have been asked me in the last few months.

1. What will a microwave system cost?

That will depend on the number of circuits required now and for future growth; the elevation between the two points; how many repeaters will be needed; the type of towers to be constructed; the buildings to house the equipment; and the land for the repeater points.

In Florida, our highest hill is only a little over 300 feet, whereas some of your properties are located in areas which have mountains thousands of feet in height, and some of your cities will be in valleys. Arguments have been offered that mountainous country is better suited for microwave. This is not always true because sometimes the two cities you wish to connect may be in valleys, say two mountains apart although only 20 to 40 air miles apart. In flat terrain it may be possible to go from telephone building to telephone building, but this is very seldom possible. Then you may have a water hop, which at the present time seems to be the most difficult obstacle to overcome.

These are some of the things that should be known before a true answer

*Mr. Donaldson, who is toll equipment engineer of the Peninsular Telephone Co. of Tampa, Fla., presented this address before the Plant Conference of the recent convention of the United States Independent Telephone Association.

can be given to the above questions, but let me give you an illustration that may answer the questions. First, let us consider two cities 20 miles part, and that the circuit requirement is 72 circuits, and only consider the cost of a microwave system or a duplication of three 24-channel systems for a total of 72 circuits.

The equipment for 72 circuits will cost from $100,000 to $140,000, depending on the type of equipment, but if we lay a 24-quad cable for 20 miles (just plowing it in and loading it), the cost would be over $100,000, not counting the repeating coils, composite sets, and perhaps voice repeaters at a cost of approximately $500 to $800 per circuit. Microwave equipment only requires the toll board relay equipment as would all cable circuits. In other words, a microwave link of 42 air miles which we have in service, consisting of 23 circuits, cost us approximately $100 per circuit mile; but we have made provision in the repeater point for several more units that could bring this cost down to as low as $60 per circuit mile because all the cost of a 300 foot tower and building is now chargeable to the 23 circuits. Do you know of any type of outside plant construction for 23 or 24 circuits that can be provided at today's prices for as low as $100 per circuit mile?

Let us make another illustration. For example, suppose you require 24 circuits between two points. First, let us consider two 12-channel carriers for this job. The cost of these carriers would be somewhere between $44,000 and $64,000. If the open wire lead is not "J" transposed it will cost several thousands of dollars to do this work according to the distance. A microwave unit for 24 circuits less towers would cost from $35,000 up to $60,000.

The approximate prices, I have given are from several manufacturers of microwave equipment and, of course, are known as laboratory model production prices. If and when sales are increased so this equipment can be produced on a production line basis, this cost can be reduced.

2. **What about tower costs?**

That will depend on the height of the tower required and the type of tower construction. For instance, it may be possible to use telephone poles. Prefabricated towers will cost from $20 up to $90 per foot according to the height and type you use.

3. **What are the costs of repeater points, and how many will be required?**

The cost of a repeater will be from $8,000 to $18,000 depending on the type of equipment. The number of repeaters required will depend on the

M. L. DONALDSON

terrain, and the air distance you wish to cover; in many cases it will be less expensive to add an additional repeater point than to construct high towers.

4. **What kind of circuits can be expected with the use of microwave?**

The 23 circuits we have in service are now set at "0" DBM from toll test board to toll test board, using a 2 DB switching pad. As to signal to noise, we find these as good if not better than most circuits. Even with a 25 DB fade inserted, we find them still to be commercial circuits, although there are only a few microwave units of the type that can be proven in by our Independent telephone field in service today. There are quite a number now being used in the industrial field, and I would recommend that if any of you have the chance to talk over these circuits to do so, and prove to yourselves the quality of the circuits.

5. **What maintenance and outage can be expected when using microwave?**

At present, most owners of microwave equipment are inspecting every station once each week. With a proper log and record of each station, most failures can be prevented, and outage will be one-half of 1 per cent or less. What other type of circuits can be provided that can come up to this performance? If it is desired to spend the money to improve this figure most all of the manufacturers can supply a duplicate transmitter and receiver with automatic switchover in case of failure.

6. **What are the requirements of the FCC regarding the use of microwave equipment?**

First, you must apply for a construction permit to establish your station, and apply for a frequency assignment that has been allotted to the common carrier group. You must have a maintenance man who can obtain, or now has a second class radio operator license, to maintain your radio equipment. You must notify the FCC inspector when you go on the air for test and line-up purposes. Then you can apply for a regular license that can be renewed each year. You must post these licenses, and keep regular logs at each station so the FCC inspector can check and ascertain if all rules of the FCC are being observed. Many of you may be wondering if your company can meet all these specifications, but let me assure you that all the manufacturing companies handling microwave equipment will gladly help you with any problems.

7. **What about the microwave equipment used by the Bell System?**

Its microwave system, known as the TD2 System, has been most successful, and there are many long hops in service today. Also, many more are being installed to handle the long-haul toll traffic. There are now many thousands of microwave circuits in service, and these circuits are being established for much less than the cost of any other type of construction. However, we in the Independent field, do not have the need for the quantity of circuits or the distances in our territory to use the Bell equipment. What we need is equipment to provide from eight to 12 circuits, up to, perhaps, as many as 600 circuits in any one direction for an average distance of not more than 100 miles that can be proven in over any other type of construction we are using today. That type of equipment has been developed, and is available to you.

8. **When should the use of microwave equipment be considered?**

If you have a new toll lead or cable lead to be constructed, get a bid on microwave equipment, and see how it compares with the other types of construction. If you have a toll lead or cable lead to move or rebuild, compare the cost with the use of microwave equipment. If you have to add to your present toll lead, compare this cost against what it would cost to acquire the circuits you need with microwave.

Perhaps most of you think I may be a salesman for microwave equipment, but I would like to reassure you that I am only the toll equipment engineer for my company, and I can assure you further that if you will contact any or all of the manufacturers of microwave equipment they will be most happy to help you with all the problems that have been brought forth in presenting this paper.

In closing, I would like to say that I am looking forward to the many further uses of electronics in the telephone field.

★ ★ ★ IN THE ★ ★ ★ NATION'S CAPITAL

by FRANCIS X. WELCH — WASHINGTON EDITOR

Telephone industry must protect itself against possible future public ownership storms . . . must thwart possible governmental ventures into communications. John L. Lewis' flirtation with dockworkers union might lead to third labor federation.

ONE OF THE long-range problems, which is deserving of careful study by the telephone industry during the New Year, is how to batten down the hatches against possible public ownership storms in the future. This may seem like a surprising statement, at a time when we have a new administration in Washington which is more sympathetic with the preservation of private enterprise than any during the past two decades. But it is precisely because there will be opportunities for crystallizing government policy against future ventures into the telephone business during the next three years, that special attention should be given to it now. It is the old story of repairing the roof while the sun still shines.

Aside from the more favorable atmosphere now prevailing in Washington (for such protective maintenance work), there are some actual clouds on the horizon. The United States Independent Telephone Association (USITA) has already moved promptly into a case before the Federal Communications Commission (FCC) involving a change of rules proposed by the state of California. This was filed (Docket No. 10777) late in November.

The purpose is to amend the FCC rules in such a way as to permit California — through its own state-wide microwave radio stations — to handle general administrative communications to all state government agencies during off-peak periods. Interested parties were invited to present their views before Jan. 15, 1954. The USITA has already started the preparation of its objection to the California proposal, as an unnecessary and unwarranted invasion of the field of private enterprise. It will doubtless object that telephone companies in California are able to furnish all the necessary service, under rates and conditions regulated by California's own public utility commission.

How FCC will rule on this remains to be seen. In a somewhat similar earlier case, the FCC did not give much encouragement to the proposed use of state-owned microwave radio networks in California for relaying farm marketing news picked up from the U. S. Department of Agriculture network. The commission pointed to the availability of wire lines or microwave facilities of common carriers used in other states distributing the Agriculture Department information of this type.

But undoubtedly in many states, particularly in the West, there is a hard core of public ownership sentiment which could be the basis for a lot of mischief in the future under more troublesome political conditions. Sometimes, these things spring up through popular ignorance of consequences, or failure to take proper precautions to protect the enterprise system. The primary responsibility, of course, is upon the industry and its management which must be alert to such dangers. And when management acts to protect the private enterprise system, it acts not only in loyalty to the best interest of its investors, employes, and subscribers, but also to defend the over-all public interest, which certainly would not be served by any unguarded slip into the numerous indirect and subtle byways leading to the socialist state.

Last month, Gov. Len Jordan of Idaho turned the spotlight on a proposed initiative to put the state of Idaho into the telephone as well as the power business. He said "it could lead to the socialization of the state of Idaho." He was speaking about a petition filed on Dec. 8 by 22 residents of Canyon County, Idaho, proposing a state authority for the "generation and sale of electric energy and operation of a communication system." In Idaho and other states, which have the "initiative" system of legislation, laws indirectly result from enough people signing such petitions.

"If 'communications' means what the dictionary says," Jordan said, "then this could mean the socialization of the state of Idaho. I want no part of it." The governor urged Idahoans "to know what they are signing before affixing their names to this petition." The request would require 27,500 signatures before being submitted to a vote—10 per cent of the Idaho vote for governor in 1950. "If they mean to change the state government, then people should know before they sign," said Jordan.

The state of Washington already is authorized to go into the commercial electric business because of just such an initiative signed some years ago during the anti-utility hysteria against the power companies in the Pacific Northwest. It is a well-known fact that people will sign anything, particularly if they are told by well-meaning reformers that it is "liberal" or "progressive." The real fact that it is nothing but sugar-coated socialism is not made apparent to such people under these conditions.

Even at the federal level there is a lot of complacency today about the remoteness of the possibility that the United States might ever want to get into the communications business. But as far as the law is concerned, there is little constitutional protection. We got a glimpse of that way back in World War I, when the government temporarily took over the nation's telephone system under a "token administration" as an emergency defense measure.

Even without the excuse of an emergency defense crisis, there are a lot of loosely construed constitutional provisions, such as the Interstate Commerce Clause and the "General Welfare" Clause, which leftish lawyers could

plausibly argue as supporting a federal adventure into the communications business if a more propitious political atmosphere would prevail in Washington at some future date. This was the way the federal government got into the power business. It will be recalled that the U. S. Supreme Court did not even allow the electric utilities to challenge the government's authority on its constitutional merits.

Even the President's treaty-making power could be used to justify congressional action in "conformity" with some future international treaty on communications, with countries owning and operating their own telephone services. The loose construction of the right of Congress to pass laws bearing out the provisions of treaties, which, of themselves, might even be in contravention of some specific clauses of the Constitution, has become a hot argument among lawyers throughout the land. It is one of the reasons advanced for the proposed Bricker amendment to prevent federal treaty-making power from invading areas now protected by the United States Constitution.

A small breach has already been made in the right of the government to finance competitive telephone operations under some circumstances via the Rural Electrification Administration. Thanks to recent reasonable administration of REA, that authority has not been abused. But administrations can change; and so can the temper of Congress. Now, is the time for the best minds of the industry to be considering more permanent types of bulwarks that will protect the industry, as such, should stormy weather come in the future. There is no easy, simple answer. More likely there are a number of possible answers. Piecemeal approach might be made through state laws and state constitutions.

The best protection, of course, is not legal at all. A continuation of the same type of pioneering or service improvement which brought the country 50 million telephones in a little more than three-quarters of a century is a real answer. If the public is constantly kept aware of such facts, as well as the far less pleasant alternatives and substitutes prevailing elsewhere in the world, the industry's foundation as a private enterprise will be well protected.

But in these times of change, particularly in view of local pressure areas, which may have to be stirred up by necessary rate cases, the old motto about eternal vigilance being the price of liberty is one for the telephone industry to paste in its hat.

John L. Lewis Goes Fishing

There is an old Chinese proverb about fishing in troubled waters—the implication being that such fishing is pretty good. If so, Chinese fishing is quite different from the Chesapeake Bay variety. But, be that as it may, John L. Lewis—controversial leader of the United Mine Workers—last week engaged in what might aptly be termed fishing in troubled waters. The troubled waters were around the New York port docks. There, a bitter bargaining election between AFL's new union of dockworkers and the old International Longshoremen's Union was taking place, under the auspices of the NLRB.

For some months now there have been recurrent rumors about an impending battle of titans in the United States labor union movement. Similar reports tempted your correspondent, a year ago, to predict an outbreak of internecine rivalry during 1953—a prediction which failed to materialize during that year.

But there is still some indication that John L. Lewis may be trying to build a third federation of labor unions in this country. For some time, there have been rumbles of discord within the AFL. Dave Beck, president of the International Brotherhood of Teamsters, is reported to be looking sharply at the top job now held by George Meany, AFL president. A few months ago the strong Carpenters and Joiners Union, under Boss Hutchinson, walked out of one door of the AFL and right back in another. Over in the CIO division, David J. McDonald, president of the United Steel Workers, is said to be unenthusiastic over the leadership of CIO President Walter Reuther. All this suggests that John L. Lewis—an old hand at labor union empire building—may be once more delving into this sort of activity.

The meeting last week between Lewis and the "independent" longshoremen's boss, Capt. Bill Bradley, brings out into the open persistent reports that old John L. is about to ride again, and is about to raid both the AFL and CIO corrals. The "independent" longshoremen's union was kicked out of the AFL because it refused to clean up alleged police characters and gangster elements. The AFL then tried to develop a "lily pure" longshoremen's union all of which led to the NLRB election. But the "lily pure" AFL version lost by a margin still subject to challenge. Capt. Bill Bradley now seems likely to fly into the arms of John L. Lewis' Mine Workers. With typical forethought, John L. has provided a snug harbor for such recruits, in the form of District 50 of the UMW, which is chartered to take in just about any kind of a union from scissors grinders to ballet dancers.

For American business, John L.'s latest adventures provoke some thoughtful speculation. Until recent weeks, there was indication that AFL President George Meany and CIO President Reuther were making real progress in their effort to have the nation's two leading union organizations get closer together.

In addition, AFL made an honest effort to clean up New York's racket ridden water front. But if there is to be a third house of labor, erected by Lewis with the aid of rebels from both of the other two national groups, it is difficult to see how the cause of labor peace is going to be advanced. The idea that the availability of rival labor union organizations would provide an "employers market" (meaning that managements could shop around for a union) was exploded long ago.

More rivalry among unions is more likely to provoke more labor unrest in the year 1954, unless John L. stops his fishing in troubled waters. But John L.'s personal unenthusiasm for either Meany or Reuther does not suggest that he is likely to break out into any promotion of an era of good feeling, unless the considerations, therefor, are well stated in advance.

Fortunately, for all business in the New York port area, Governor Dewey's New York-New Jersey water front compact has cleaned up hiring practices so as to eliminate the criminal element. But there are many business organizations throughout the country, as yet unorganized or with independent or other contracts expiring in 1954, which will have to look forward to at least the possibility of dealing with three instead of two rival organization efforts.

Nothing Like "Mossy" in Washington

This is the season, in the New Year, when prizes are awarded for unusual accomplishment during the previous year: "Man of the Year"; "Felon of the Year," and all that. Here's this department's nomination for "Clown of the Year."

No doubt it's a fine thing for our nation, as such, but the journalist corps and others of us, who try to make a living in the District of Columbia as so-called "Washington observers," are sometimes tempted to envy foreign countries some of their more newsmaking, colorful public figures. With all due respect to the dignity and ability of our present leadership in the White House and throughout most of the departments, we have

(Please turn to page 31)

THE PLANT MAN'S Notebook

by Ray Blain, Technical Editor

WE RECEIVED a very nice letter from Richard Wagner Jr., engineer for the New York Telephone Co., in which he makes some very flattering remarks concerning our efforts on this page.

Mr. Wagner stated that he has been following this scribe's writings in TELEPHONY for over 30 years. We never dreamed that any one could stand that much punishment.

He also referred to an answer we gave to a question last July regarding steps to be taken in order to eliminate power noise on a half-mile open wire power parallel lead. We recommended checking of grounds and low insulation leaks as well as throwing in of transpositions, but failed to mention the checking of splices for high resistance.

Mr. Wagner pointed out that resistance unbalances can bring in severe cross-talk conditions which are less likely to be averaged out on a short than on a long line, so that a single bad splice on a short lead may create a lot of noise. This condition should be especially checked in cases where only one side of a pair has been replaced and the better compression type sleeves have been used for splicing.

• • •

Our old friend, Harry E. Hershey, plans to retire on Jan. 31, 1954, after 43 years of service with the Automatic Electric Co. Your writer first met Harry when he was an officer in the communication section of the Artillery back in 1918 at Camp Dodge, Iowa.

Also, since 1917, we have read each new edition of his "*Automatic Telephone Practice*," which is now in its seventh edition. Harry will be available for consulting services after Feb. 1. We wish him every success with his second 30-year plan.

• • •

A young lady employe of the telephone company has been prescribing for the telephone ills of St. Louis business firms for the past five years. This lady diagnoses the business subscribers' telephone usage to find out what kind of telephone service they are giving the public.

This is accomplished by connecting two telephones with microphones mounted in the mouthpiece with a wire recorder. The subscribers carry on a normal conversation with each other and then have the conversation played back. It teaches them good telephone technique and at the same time, improves the quality of their telephone voices.

• • •

A new hydraulic cable cutter, with a capacity up to 3½ inches and with a handle pull so simple a small boy could operate it, has recently been placed on the market (See photo).

This tool rests solidly on the floor or any flat surface, but may be bolted down, if desired. The long swivel-type

handle eliminates stooping and may be operated at any angle. It requires only seven hand strokes per inch.

This new unit is all cutter with no excess weight or bulk, the manufacturer states. Nevertheless, the construction is rugged enough to handle the full power of the 10,000-pound hydraulic jack which powers it. This jack is self-retractable and may be stopped at any desired cutter opening by means of a release valve. The cutting edge is protected by a brass insert in the anvil. The weight of the complete cutter is only 30 pounds.

• • •

Television is fast becoming a most important by-product of the telephone industry. About five years ago, the Bell System opened 916 miles of television channels for commercial use to provide network service to 12 stations located in five different cities. Today, there are more than 34,000 channel miles of facilities used to carry network television to about 150 stations in more than 100 cities. It is expected that 47,000 channel miles will be in service by the end of this year.

A new dimension was added to television coverage in September of last year when 50 theatres in 30 cities were linked on a closed circuit to witness the Walcott-Marciano fight. Then, in November, the nation watched history made at election day when the coverage was 110 stations in 67 cities. Again, in January, 1953, an estimated audience of 75 million Americans witnessed the Presidential Inaugural ceremonies in Washington. In that same month, the United States extended the neighborly bond of television across our national border to Toronto, Canada, establishing the first regular video link between the two countries.

• • •

We recently received a report of a case of trouble on an aluminum conductor cable. It appears that moisture entered this cable and caused trouble on only a part of the pairs. Then lines were switched to working pairs until the entire cable finally failed.

Moisture had been in contact with some of the current-carrying pairs for some time, and when the cable was opened, some of the conductors were found in powder form.

If any of our readers have had experience with moisture trouble on aluminum conductor cable, will you please tell us about it?

Checking new equipment prior to the cut-over to dial operations. The author is on the left.

Planning The Dial Cut-Over

BY W. A. MUCKEL

CONVERSION from manual to dial operation, though an old, old story to some, is, however, new to others because no two cut-overs are ever identical. In this article, the writer is not considering a large operating company's conversion where the usual elaborate and meticulously prepared details are planned and worked up well in advance of the actual cut-over so that this operation becomes just another routine item of daily work. Instead, consideration will be given to the cut-overs performed by the smaller Independent companies, the territories of which present unprecedented problems and, of course, must be coped with either prior to or during the actual cut-over.

In some of these smaller systems, the plant records are usually filed in the mind of a combination all-round central office man who wears several different hats. At certain times, this important information is not readily available and may cause many anxious moments.

As is usual in such cases, very little if any preparation is made prior to a cut-over. When the zero hour arrives, the various operations are attempted, some completed in order of their importance. Others are cared for as noted or reported. Many troubles incident to the cut-overs, if handled in this manner, may not be detected for several days and, then, by various reporting media such as a call from a neighbor's telephone, a walk to the central office or a drive, if from a distant location.

It is most essential, however, even in the small offices, that a well-planned cut-over procedure be prepared, a copy provided to each participant, and the duties of each assigned well in advance of the actual cut-over. If considered necessary, a rehearsal of the procedure may be held the day previous to the cut-over. Generally, the cut-over date as set is the zero day and zero hour known as "C" (cut-over) day. Related operations are all based on that day. Operations to be considered for the actual cut-over are many and sufficient time must be available pre-

vious to "C" day for their proper accomplishment.

A new directory is to be considered with probably a 100 per cent change in subscribers' numbers. The new listings should be assigned according to traffic studies so as to make efficient use of the dial equipment. The time element is always an important factor in connection with the compilation of a new directory. These directories should be delivered to all subscribers several days prior to the actual cut-over. Cable pair assignments are also made and from this record the main frame work may be accomplished. Changes of main frame jumper assignments are usually possible up to within a day or two of the actual cut-over. Necessary time must be available, however, to test and verify all such changes.

Number plates listing the new numbers must be installed well in advance of the cut-over as this is usually a rather slow process, although not a highly technical or difficult problem.

The new number plate is usually installed permanently on the new instrument and the old number card secured over it by scotch tape or similar material. At the proper time, the old number card can be removed easily by the subscriber without the help of anyone from the central office.

The outside plant must be completely checked well in advance of a change from manual to dial operation and usually from 24 to 48-volt operation. Corrective measures should also be taken to clear up all recorded troubles. This is most essential for the proper operation of a dial system, though it may not be so important on a local battery or a simple manual common battery system where operation is possible after a fashion even with low insulation resistance.

It is always considered a step up from local battery to common battery

(Please turn to page 31)

Everyone is busy on the night of the cut-over to make sure all equipment is installed properly so that trouble will be held to a minimum.

Operators work at a temporary desk to answer requests for information immediately after cut-over.

These men are getting ready for cut-over to dial by running jumpers on the main frame.

One of the most important steps in cutting over to dial is checking the storage batteries.

This cable splicer is completing his work for the cut-over in the vault at the central office.

Economic Developments

IN TELEPHONE WIRE PLANT FACILITIES

By JOHN A. McKINZIE*

BECAUSE of the rapid technological advancement in the telephone industry during the past few years, many new developments in *wire plant* facilities have been created and placed in service.

The first telephone lines were bare iron wires tied to glass insulators, attached to cross-arms on poles or roof structures. These lines served their purpose reasonably well, but as the telephone industry expanded and more lines were added, the number of wires entering the central offices grew to intolerable proportions. The congested wire circuits were subject to serious and frequent interruptions from storms. Maintenance of these lines consequently was very expensive. It was not until lead-covered cable with paper insulated conductors was developed that this problem was solved. Telephone lines encased in protecting lead sheath were relatively free from damage by storms, particularly when the cable was placed underground.

Because of the attenuation characteristics of cable, however, it was not possible to employ long cable for toll and trunk lines, without using expensive heavy gauge copper conductors, until the loading principle was developed. The development of loading coils made possible the use of smaller gauge conductors in cables and reduced the cost. Loading also made practical long entrance cables from the open wire junction to the central office and eliminated tall, ungainly pole and cross-arm structures within town limits. Some companies make extensive use of toll cable between towns.

The use of copper in place of iron in open wire conductors increased the speech transmission range and made long-haul toll circuits practicable. Loading was applied to open-wire circuits as well as to cable circuits to improve speech transmission still further. Later, the invention of the vacuum tube repeater did away with the necessity for loading open wire circuits and greatly extended the speech transmission capability of both open wire and cable circuits.

With the continuing growth in the number of physical circuits in cable and open wire, however, construction and maintenance costs also rose. In the case of conduit installations, improvements were made in the insulation on cable conductors, in an effort to squeeze in more pairs within the same volume enclosed by the cable sheath. By removing older cable of lower pair capacity from congested conduits, and pulling in new cable of greater capacity, costly installations of additional conduit could be deferred. For example, older 1515-pair, 24-gauge cable could be replaced with 1818-pair cable of the same gauge within a sheath of the same external diameter, a gain of 303 pairs per duct.

J. A. McKINZIE

The phantom circuit idea was developed early in telephone history to produce a third circuit superimposed on two pairs of open wires. Although the phantom arrangement did effect savings over a third physical pair, it was especially prone to noise, unless the phantom and the associated physical circuits were carefully balanced. This required proper transposing and the elimination of tree and other ground contacts and high resistance connections in the line wires. These factors limited phantoming to toll and trunk line, which are more valuable than ordinary exchange or farm line circuits and hence can be better maintained economically. Phantoming also was applied to toll circuits in cable through the use of "quads." Carrier systems have now replaced phantom circuits for voice frequency applications.

Economic Features of Carrier Systems

The carrier frequency principle was the next step in the progress towards adding more circuits without increasing the number of physical wire or cable circuits.

By using different frequency bands above the normal voice frequency range of 3,000 cycles, it is possible to add one to three transmission channels for two pairs of wires and thus obtain three to five transmission paths including the voice frequency circuits.

The major factor in determining the economy of using carrier versus stringing additional open wire is the cost of terminal equipment. This cost goes up rapidly with the increase in the num-

*Mr. McKinzie, who is a member of the USITA Plant Committee and plant superintendent of the Lincoln (Neb.) Telephone & Telegraph Co., prepared this paper for the Plant Conference of the recent USITA convention.

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ber of channels. For this reason, the multi-channel carrier system is generally considered economical only in toll circuits where the lines are not much under 100 miles long. Without repeaters, the maximum length of single and three-channel carrier lines is 150 miles. When repeaters are used, these carrier lines can be of any length. Another cost factor is the need for elaborate carrier type transpositions to minimize cross-talk, which is more difficult to prevent than at voice frequencies.

New Types of Carrier Systems

Although it is possible to apply single channel carrier systems to lines from 30 to 50 miles long, there was a need for multi-channel carrier systems that could be used on lines of any length from 15 to 150 or 200 miles without use of special filters and networks in cable pairs or elaborate transpositions of open wire circuits. To meet this need, new types of carrier systems have been developed. One type is designed for cable transmission and another is intended for use in open wire lines.

The new carrier equipment available for cable transmission will provide high-grade, low-loss circuits using a four-wire quad in a single ordinary exchange cable to transmit 12 two-way telephone conversions over a frequency range of 48 to 256 kilocycles. (One make of carrier equipment will provide 24 channels.) In contrast, the older types of carrier systems require two cables, one for the east-to-west pairs and the other for the west-to-east pairs to minimize cross-talk effects.

Certain features of this equipment greatly contribute to its economical operation. It has a compandor that compresses the speech volume at the outgoing end and expands it to its original value at the incoming end. This permits speech transmission through noise and cross-talk, and it is not necessary to use cross-talk balancing networks between pairs or noise suppression filters. Simpler, more economical filters can be employed. Circuit components need not be critical in their adjustments. A frequency changing arrangement ("frequency frogging") at each repeater prevents cross-talking from the outputs back into the inputs through other cable pairs and also equalizes the attenuation of the different channel frequencies. The equipment is very compact because of the use of miniature tubes and components. Each channel unit has a plug-in feature that enables it to be replaced immediately with another unit in case of failure.

The carrier system intended for use on open wire lines consists of four groups of four channels, covering a frequency range of 2 to 156 kilocycles. It has some of the essential features of the carrier system for cable transmission, which enables it to transmit through severe noise and cross-talk interference. It will provide circuits to small towns or along a secondary route on open wire lines from 15 to 150 miles long. These circuits are used for short-haul toll service, trunks between tributary offices and their toll center, and for exchange service. On these lines, growth is relatively slow and usually consists of a voice frequency circuit with single channel carrier.

When, as often happens, a manual tributary office is cut over to dial operation, and the operators are moved to the toll center, additional circuits are needed from the toll center to the tributary office to enable the subscribers to reach an operator for special services, such as directory information, reports on the availability of toll circuits, service complaints, etc. This increase is ordinarily provided for by adding single-channel carrier systems to the lines, until a point is reached where it is necessary to string more copper wire, or to provide multi-channel carrier systems. Stringing additional wire is costly from a material standpoint, while installing a multi-channel carrier system requires expensive terminal facilities and line rearrangements.

With the new open wire carrier system, circuit additions can be made to these lines without expensive line rearrangements or stringing additional wires. Non-loaded entrance cables can be used and, with simple arrangements, the new carrier system groups can be added above existing carrier systems having a top frequency of 30 kc. With the compandor, it is possible to apply the second frequency group to practically any open wire transposed for standard C carrier operation, thus nearly doubling the number of circuits without additional line rearrangements. For the higher frequency groups, transposition arrangements are expected to be less expensive to apply than in the case of older carrier systems. Line losses of 35 to 40 db can be tolerated under normal wet weather conditions, and 50 db loss under sleet conditions with some transmission impairment. Repeater spacings of 50 miles in sleet areas for the second frequency group, and 100 miles in other areas are planned. For the higher frequency groups, these spacings will be approximately halved.

Microwave Systems in Toll Plant

The next logical step in the use of carrier frequencies over wire circuits is to eliminate the physical circuits entirely and, instead, transmit speech intelligence in different frequency bands over a high frequency radio wave beamed from one fixed point to another. High frequency radio waves of about 900 mc and upwards have properties similar to light in that they can be focused and beamed to one point. They are popularly termed "microwave."

Multi-channel microwave is like a wire line used with carrier, except that microwave equipment is substituted for the wire between the carrier terminals. The carrier equipment is thus connected to a microwave circuit instead of a four-wire metallic circuit. A microwave transmitter and a receiver are provided at each end of the line, with perhaps one or more repeating stations between the terminals.

Microwave equipment is available, which accommodates as many as 36 toll grade voice channels. More channels can be made available for special applications. Each of the voice channels can, in turn, accommodate the usual number of telegraph, telemetering, or remote control signals.

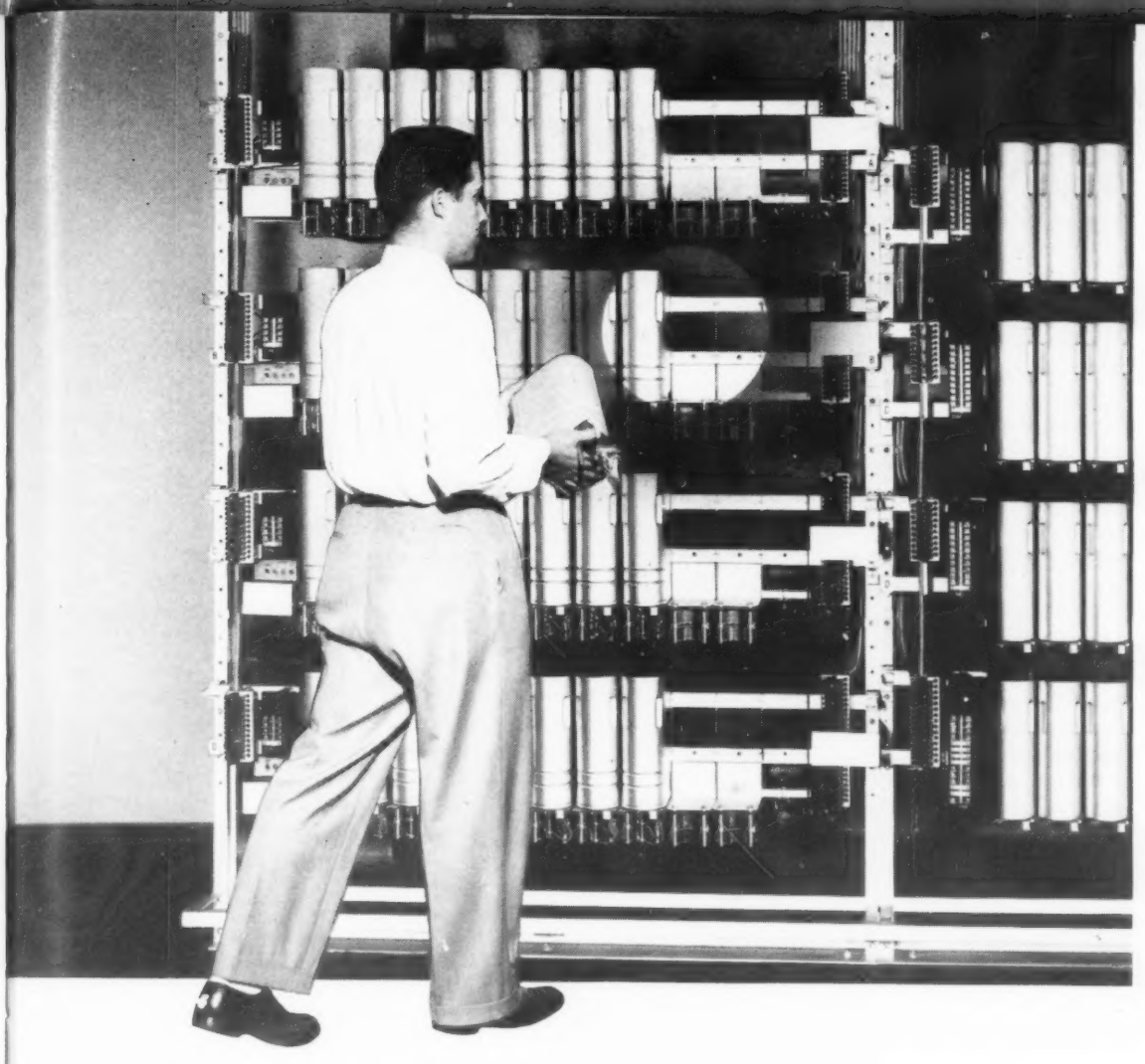
A two-way microwave system may be said to have the same application as a four-wire metallic circuit with carrier and may be used with suitable carrier equipment in place of aerial or buried cable or open-wire line for short, medium, or long-haul circuits with no loss of performance, quality, or reliability. It can be used for voice, telegraph, telemetering, and various types of signaling.

Microwave holds considerable promise for providing an economical means of transmitting and receiving a considerable number of frequency bands carrying speech intelligence particularly where high grade toll circuits are involved. For one thing, microwave equipment is less subject to weather disturbances than open wire lines. Other than mechanical failure, due to wind, only heavy ice loading will affect the performance of microwave antenna equipment. Compared with pole lines, the antenna mountings and masts of a microwave link can be built more economically to withstand the most severe icing conditions. Maintenance is required only at the terminal or repeater points.

Subscriber Carrier System and Radio Link

Although carrier systems and microwave equipment are generally applicable to toll lines, it is possible to apply carrier and microwave economically to subscriber lines under certain circumstances. Recent articles in telephone

(Please turn to page 37)



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MAINTENANCE TESTING EQUIPMENT

By JOHN A. BRACKEN

INASMUCH as a cold cathode tube operates as a polarized relay for the purpose of connecting the selected station bell for ringing in a four-party full selective signaling system, its proper functioning depends upon: (1) Tube and ringer connections; (2) polarity and voltage of the superimposed ringing current; (3) direction of the current through the tube and ringer, and (4) a good ground connection.

A schematic drawing of a full selective four-party system containing a three-element cold cathode tube relay is shown in *Fig. 1*. In this arrangement, whether the anode or cathode of the respective station tube is connected to the ring or tip side of the line is determined by the bias of the ringer. For example, when superimposed current is connected to the ring, as shown in *Fig. 1*, current flows through the 120,000-ohm resistors of Party 1 and Party 3 tubes and ionizes them as indicated by the arrows.

Due to the anode of the Party 1 tube being positive, current also flows in the tube main circuit and operates the associated ringer. Party 3 bell does not ring because the tube anode is negative. If negative superimposed current is connected to the tip, Party 2 bell will ring, but Party 4 will not.

PART 68. The preceding article in this series appeared in the Oct. 3 issue, page 27.

Similarly, if positive superimposed current is connected to the ring side of the line, it will operate Party 3 ringer, and if connected to the tip, Party 4 bell will ring.

Fig. 2 is a wiring diagram showing the tube and ringer connections of each party between the line circuit tip, ring and ground as indicated in *Chart 1*.

Fig. 3 represents a party verification test circuit consisting of a voltmeter, relay and associated operating battery, two switching keys, "K 1" and "K 2," and a test battery of sufficient electromotive force (EMF) to break down the cold cathode relay control gaps.

This testing feature involves the application of the test battery to the tip or ring of the line circuit. When battery EMF and polarity are such as to pass current through the telephone set tube and ringer circuits, a distinctive deflection will be obtained across the voltmeter scale. This indicates the presence or absence (as the case may be) of the particular party station under test.

In order to know just what the voltmeter reading should be for determining the presence or absence of any station by means of its polarity, it will be necessary first to obtain voltmeter readings applicable to the particular type cold cathode relay and ringer involved. This may be accomplished by:

(1) Connecting four tube telephone sets to form a full selective four-party line as shown in *Fig. 1*.

(2) Connecting the tip and ring of this dummy line to a suitable test circuit, or to testing equipment arranged as shown in *Fig. 3*.

(3) Opening the ringer circuit at

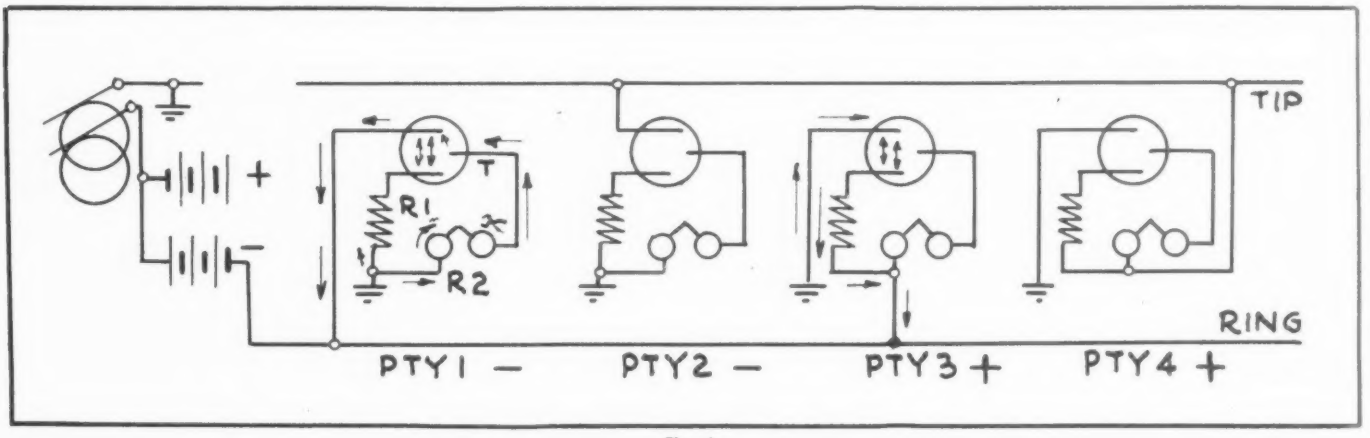


Fig. 1

FIGURE 1		FIGURE 2		GENERAL TO FIGURES 1 AND 2	
Designation	Indicates	Designation	Indicates	Designation	Indicates
R1	120,000-ohm Resistor	L1	Line One	PTY	Party
R2	1,500-ohm Ringer	G	Ground	TIP	Tip Side of Station Line
T	Cold Cathode Tube	L2	Line Two	RING	Ring Side of Station Line
		Y	Yellow Tube Lead	PTY 1—	Negative Station
		R	Red Tube and Ringer Leads	PTY 2—	Negative Station
		B	Black Tube and Ringer Leads	PTY 3+	Positive Station
		T	Cold Cathode Tube	PTY 4+	Positive Station

Chart 1

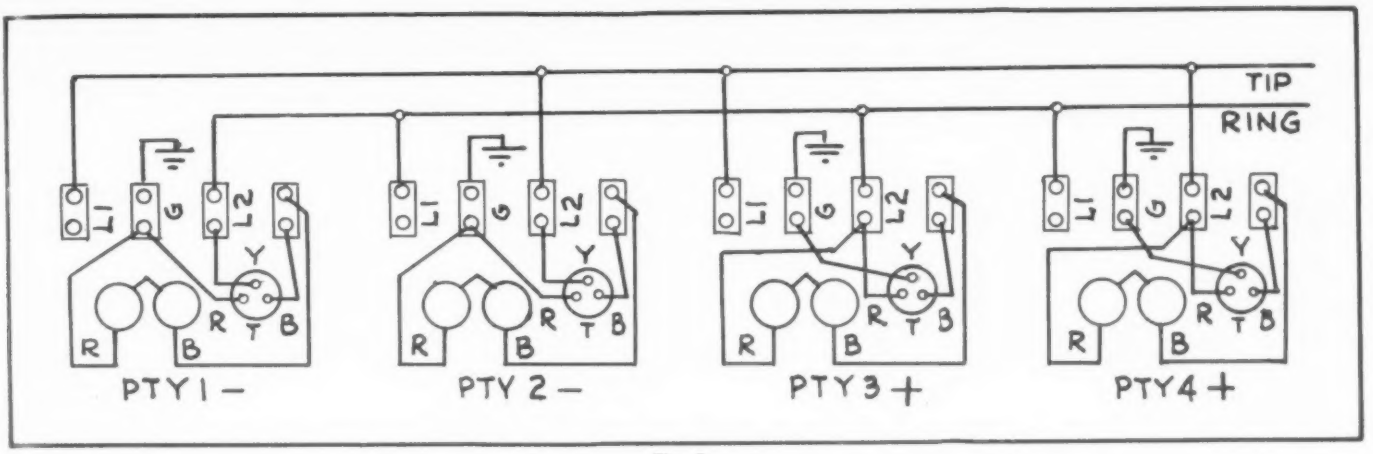


Fig. 2

each station telephone set by disconnecting one of the ringer leads.

(4) The following instruction refers to the use of *Chart 2*, which is arranged to conform to the application of the testing feature of *Fig. 3*, where with keys "K 1" and "K 2" normal, a test of Party 1, which is a negative station on the ring, is made.

(5) The reading obtained should be recorded on *Chart 2* under "voltmeter reading—ringer disconnected."

(6) Reconnect Party 1 ringer, and again observe the voltmeter deflection. It should be greater than before, indicating the presence of Party 1 on the line.

(7) This reading should be recorded on *Chart 2* under "voltmeter reading—ringer connected." Note: The voltmeter readings shown on *Chart 2* are assumed values, given as an illustration only.

(8) By operating key "K 1," similar tests can be made for Party 2, which is a negative station on the tip. The operation of key "K 2" in conjunction with "K 1," makes possible tests of Party 3 and Party 4 in the same manner as for parties 1 and 2. Voltmeter readings thus obtained may be used as a standard for verifying the absence or presence of a particular station on a working full selective party line.

Any appreciable difference in the voltmeter readings above or below the standard value could be taken as indicating that the station of the polarity for which the test is being made, is not properly connected to the side of the line under test, or that a trouble condition exists.

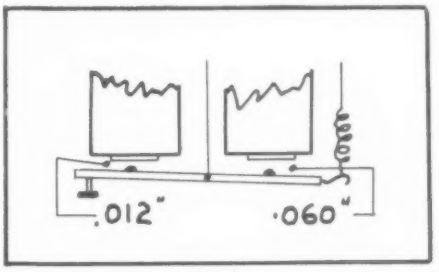


Fig. 4

Party	Polarity	Side of Line	Position of Keys		Voltmeter Reading—Ringer Disconnected	Voltmeter Reading—Ringer Connected
			K 1	K 2		
1	Negative	Ring	Normal	Normal	20	40
2	Negative	Tip	Operated	Normal	20	40
3	Positive	Ring	Normal	Operated	20	40
4	Positive	Tip	Operated	Operated	20	40

Chart 2

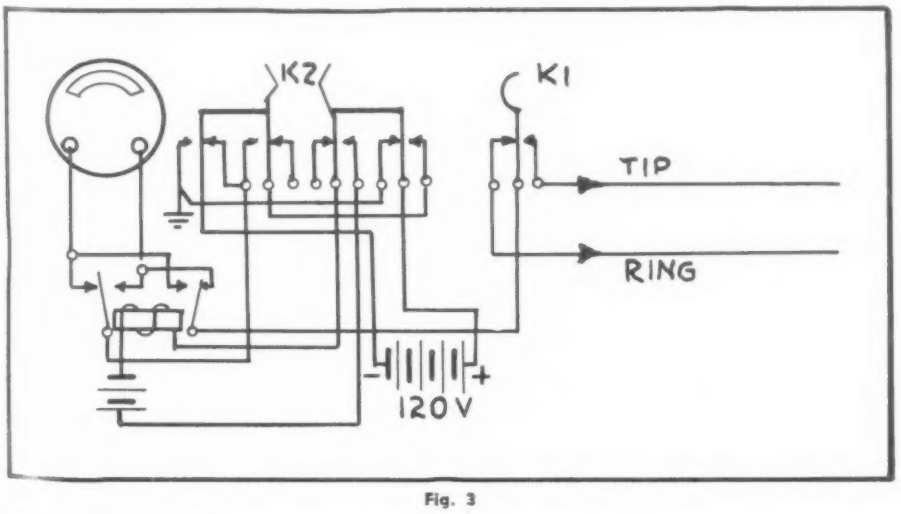


Fig. 3

For example, if the tube and ringer connections are incorrect, it may cause the station to respond to the wrong polarity, or fail to give the proper results on test.

When testing ordinary trouble on a line having cold cathode tube relays in the station ringing circuit at a local test desk, the EMF of the test battery should be low, or not more than 20 or 30 volts.

Such low voltage test desk battery is insufficient to cause an ionization of the cold cathode tube relays. Consequently, any deflection across the test desk voltmeter scale is indicative of an actual trouble condition on the line.

If the test desk is equipped with a 100 volt battery, its high voltage will ionize one or more of the station tubes, causing a false short or ground reading. In this case, although the insulation of the line circuit being tested is O.K., it appears to be defective. So-called high EMF line insulation breakdown tests involving a direct current voltage of 200 or more, should not be applied to party lines with tube relays in the telephone sets.

If such a test is used, the result would not be of any value, since it would cause a discharge in the tubes which would reduce the effectiveness of the test voltage to a point no longer

(Please turn to page 39)

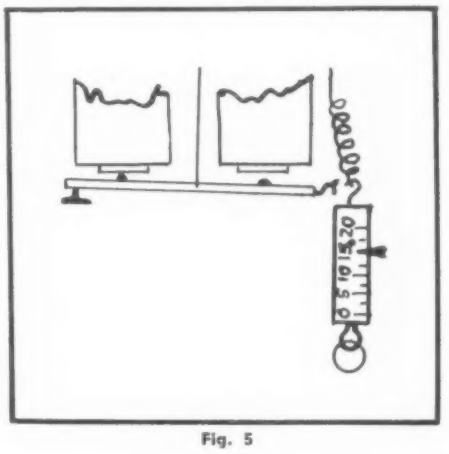
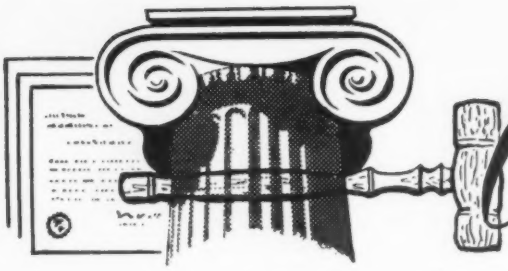


Fig. 5



Courts and Commissions

Neb. Company Gets O.K. to Serve Another's Rural Subscribers

The Petersburg Telephone Co. on Dec. 10 was granted a certificate of convenience and necessity by the Nabraska Railway Commission to provide switched service to 10 rural subscribers formerly served through the Cloister exchange of the Shell Creek Mutual Telephone Co.

The action resulted from a petition for such service received by the Petersburg company from these subscribers.

Replying to complaints at the hearing that service at Cloister was inadequate, the Shell Creek company said it had applied to the Rural Electrification Administration for a loan to finance the construction of systems at Cloister and Clearwater. If the loan is obtained the company expects to provide improved service within a year and a half.

V V

Ohio High Court Refuses to Void Bell Company Rate Raise

It was reported on Dec. 24 that the Ohio Supreme Court refused to void an annual 20 per cent rate increase for Cincinnati & Suburban Bell Telephone Co. (TELEPHONY, June 13, p. 35).

The court acted on a mandamus filed by the city of Cincinnati in an attempt to secure a decision on the rate increase. The court held a writ of mandamus could not be invoked as a substitute for the remedy of appeal.

A May 29 order of the Ohio Public Utilities Commission granted a $4,637,436 annual increase to the company. An appeal from that order is still pending.

V V

O.K. Extended Area Service for Two NW Bell Nebraska Exchanges

The Northwestern Bell Telephone Co. will extend the common service area of its St. Libory, Neb., exchange to provide non-toll extended service to Grand Island and St. Paul, Neb., at Grand Island exchange rates. The service area of Grand Island will also be extended to provide service without message toll charge to St. Libory.

This was authorized on Dec. 10 by the Nebraska Railway Commission to become effective with the conversion to dial of the St. Libory exchange in September, 1954.

Extended service is now available to St. Libory's town subscribers on an optional basis to either Grand Island and St. Paul or both. All rural subscribers receive Grand Island service at Group "A" rates and extended service to St. Paul is optional at a 25-cent charge.

Company studies show that 98 per cent of St. Libory subscribers receive Grand Island service and 38 subscribe to St. Paul service. These subscribers were interviewed and 150, or 97 per cent, of them signed application cards favoring the company's proposed service and rate plan.

Extended area service trunks from St. Libory to Grand Island will be increased from four to seven. Calls from St. Libory to St. Paul now being routed through Grand Island will be handled on three direct circuits to St. Paul. The annual exchange revenue is expected to increase $1,400 under the new arrangement but toll revenue will decrease $401, leaving a net annual revenue increase of $999.

V V

Additional Rate Raise Granted New England T&T in R. I.

Rates of the New England Telephone & Telegraph Co. will shortly be increased in accordance with an order issued by Rhode Island Public Utility Administrator Thomas A. Kennelly (TELEPHONY, Aug. 8, p. 40).

Kennelly granted the company permission to raise its rates to yield about $786,000 annually. While the company has 30 days in which to file the new tariff, it was expected that this will be done in about a week.

The latest ruling completes a series of moves starting in 1951, when the company asked for $2,150,000 additional revenue. After extended hearings, Kennelly issued a finding in September, 1952, authorizing an increase of $1,168,000. The company appealed to the Rhode Island Supreme Court for the full amount. At that time, rates to yield the $1,168,000 went into immediate effect.

In July, 1953, the high court declared that it needed more data to determine whether the Kennelly ruling was equitable. The court held that Kennelly could either furnish additional data without changing his 1952 decision, or could arrive at a supplemental finding after review of the evidence.

The $786,000 allowed on Dec. 16 by the administrator, plus the $1,168,000 allowed in 1952, make a gross increase of $1,954,000 in the past 15 months, still short by $196,000 of the added revenue sought by the company. Kennelly stated that the current decision is computed to yield a 6.2 per cent return on the rate base.

The company contended that it requires a 7.5 per cent return to attract venture capital, predicating this on a debt ratio of 35 per cent for bond money and 65 per cent for common stock funds. Kennelly stated his belief that the company could market its securities with a debt ratio of 42 per cent and an allowance of 58 per cent for equity capital.

V V

Carolina T&T Rate Increase Upheld in N. C. Superior Court

A Superior Court order signed on Dec. 21 holds that the North Carolina Utilities Commission was right in granting a $537,210 rate increase to the Carolina Telephone & Telegraph Co., Tarboro (TELEPHONY, Nov. 28, p. 32).

The rate decision by the commission was appealed to the courts both by the company, which contended that the amount granted was not enough, and by attorneys for the subscribers in various eastern North Carolina cities and by the state's attorney general, representing the public, who contended the increase was too much.

The city of Wilson and the state of North Carolina notified the commission on Dec. 23 that they will appeal from the superior court decision upholding Carolina T&T's rate increase.

The case was argued recently before Superior Court Judge Walter J. Bone, who, in the order just signed, declared that "the court is of the opinion that the record, correctly interpreted, does not show that the commission in making its decision eliminated from consideration any of the evidence perti-

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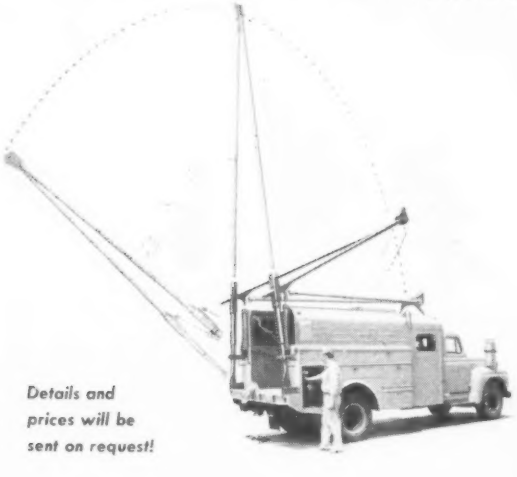

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nent to the (key) factors, nor that it was influenced in its decision by any evidence not pertinent." He said this is all that is required by law, since "the law makes the utilities commission and not the court, the tribunal for analyzing, considering and determining the weight of each part of the evidence."

Judge Bone ruled that technical issues raised in the case are solely for the commission to decide and that the state statutes give it broad discretion and impose on it no requirement to "use any particular method of accounting."

He said that "the law requires only that, in fixing rates, the commission shall take into consideration the evidence bearing upon the factors set out in the statute, together with the proof of any other factors that will enable it to decide what rates and charges are reasonable under the circumstances."

"The errors assigned by both applicant and the protestants seem to relate the methods used by the commission in analyzing, weighing and considering the evidence and to the weight or lack of weight given to certain parts of the evidence, but the court is of the opinion that these are not questions of fact and do not involve legal propositions," the judge wrote. He said nothing in the record appears to show that the commission had been "arbitrary or capricious" or had found facts other than by authority provided it by law.

The company had asked for an increase of at least $2,150,000 and a 7.5 per cent rate of return, and appealed the commission decision to the courts on the contention that the amount granted would not permit it to show sufficient profits to attract new capital for expansion and improvements. It said the commission had not given enough consideration to its rapidly growing investment and the fact that construction costs in the telephone business are unusually high.

The protesting subscribers and the attorney general's office appealed on the grounds that the commission should not have granted any increase at all. They argued that there was ample evidence to show that the company already is making an adequate rate of return on its investment, and that the cost of telephone service due to many rate increases since World War II is rapidly climbing out of the reach of many persons, and that many items which the company had included on its list of investments should have been excluded.

The $537,210 which the commission granted in higher exchange rates and charges, together with $235,000 which the company was expected to receive as its share of a general increase in intrastate long distance tolls allowed last April, would boost the company's annual income $772,210, which the commission in its order of July 14 said would provide a return of 6 per cent on net investment. The commission said it considered a 6 per cent return adequate.

Both sides now are considering appealing Judge Bone's decision to the state supreme court, where a similar case involving Southern Bell Telephone & Telegraph Co. now is pending (TELEPHONY, Nov. 7, p. 38).

In both cases, the court was asked to determine whether the companies should be allowed to include in their rate base, allowances for cash working capital and materials and supplies.

In the Southern Bell case, Superior Court Judge William H. Bobbitt questioned such allowances but also questioned whether the commission should not have made a more liberal allowance for depreciation. His ruling has been appealed to the state supreme court.

V V

Northwestern Bell Gets Mobile Service Increases in Nebraska

Increases in rates for mobile telephone service have been granted the Northwestern Bell Telephone Co., by the Nebraska Railway Commission, effective Jan. 1. The order was issued on Nov. 28, with Commissioner Harold A. Palmer dissenting.

The company said that increased costs of providing service made the application necessary. It pointed out that general rate increases for exchange and toll service had been made in recent years and that the burden of additional revenue also should be borne by users of mobile service. Present rates were established in 1947. Since then the company has had four general rate increases in which raises for mobile service were not included. Thirty-six customers use the service. Tariff revisions provide for the following:

Dispatching Terminals

Location of dispatching office	*Installation Charge*	*Per Month*
Principal exchange	$5.00	$ 6.00
Zone A	5.00	12.00
Zones B and C	5.00	18.00

General or Dispatching Service

For general or dispatching service, ea.		
Single-channel set	$50.00	$25.00
Two-channel set	50.00	28.00
For signaling service, ea.	25.00	12.50

The installation charge for general and dispatching service on watercraft is $75.00.

Estimated additional revenue was set at $6,240. However, the commission's order stated that because of additional plant investment and increased general expenses, the company would not earn a greater rate of return than was allowed in the last general rate order.

No objections or protests to the proposed rates and charges were received by the commission.

In a dissenting opinion, Commissioner Palmer said that proof for the need of additional revenue had not been established, that a formal application had not been presented but instead, was made by correspondence, and that interested parties had not been given proper opportunity for hearing.

The majority opinion was written and signed by Richard H. Larson, commission chairman, and Joseph J. Brown, commissioner.

V V

Southern Bell Appeals Tennessee Rate Case

It was reported on Dec. 17 that Chancellor William J. Wade has taken under advisement a plea by Southern Bell Telephone Co. that he override the Tennessee Railroad & Public Utilities Commission and give the company permission to raise its Tennessee rates about 7 million dollars a year.

The commission denied the rate increase proposal earlier this year (TELEPHONY, July 25, p. 38) after long hearings. It was said that an appeal to the Tennessee Court of Appeals would probably be made by whichever side loses in the chancellor's decision.

V V

North Dakota Company Asks New Rates After Cut-Over

The Traill County Telephone Co., Hillsboro, recently requested of the North Dakota Public Service Commission authority to establish new rates for its subscribers.

The company is requesting new rates following conversion of its system to dial operation.

V V

Suspend Pa. Company Increase

Meadville Telephone Co. recently had its request for a $152,000 rate increase postponed for three months, from Nov. 1 to Feb. 1, by the Pennsylvania Public Utility Commission, following an earlier six-month suspension, which ended on Nov. 1 (TELEPHONY, Mar. 14, p. 30).

V V

O.K. Stock Issue to Pay Notes

The Oregon Public Utilities Commissioner on Dec. 21 authorized the Mal-

heur Home Telephone Co., Boise, Idaho, to issue 22,000 shares of $10 par common stock to its parent company, Mountain States Telephone & Telegraph Co., in payment of certain notes. The Malheur company operates three exchanges in Oregon.

V V

Plan Sale of Minnesota Company to Independent

It was recently reported that the stockholders of the Clayton Telephone Co. in Minnesota voted to sell the company's properties to the Bricelyn Telephone Co.

The Bricelyn company has agreed to rebuild the Clayton company's plant and to replace its equipment.

The Clayton company has an option to buy back its properties at cost if the new service is not fully satisfactory.

IN THE NATION'S CAPITAL

Concluded from page 16

no sure-fire newsmakers such as Great Britain's Winnie Churchill.

Of course, President Eisenhower yields to nobody in heroic background glamor, and for a spare we still have Gen. Douglas MacArthur. But we'd have to go all the way back to Teddy Roosevelt for all-around color and unpredictable reaction, such as some of the European countries have these days. True, in the straight "character" department, we had the late self-confessed "Curmudgeon," Harold Ickes, New Deal Secretary of Interior and the late Sen. Huey Long, the self-made Caesar from the Bayou country. But where would you find, even among second string American politicians, as good a ham-and-clown combination as Farouk?

However, it is Iran's ex-premier, Mohammed (Weeping Willie) Mossadegh —rhymes with turkey neck, which he looks like, very much—who should get the first prize in the cornball department. Aside from getting off with three years on a rap including high treason, incitation to riot, murder, etc., his public record is astonishing! Consider what this one homely little aged man did in little more than two years, as chief of state:

First, he cut off his country's main source of revenue by nationalizing Iranian oil. He succeeded in alienating the friendship of most Western powers and almost succeeded in starting a shooting war with Britain. Then, he chased the Shah's sister (a real beauty, too) out of Iran. Next, he chased the Shah himself out of Iran. Then, he chased the Parliament out of the capital and appointed himself dictator. He set up the Communist Party in business and openly incited it to rioting and sabotage at great damage to Iranian national security from neighboring satellite-hungry Russia.

But it will not be in the field of statemanship, or lack of it, that old "Mossy" will be remembered. Rather it will be as a comedian and ham actor. Such is the perversity of history. He stole every scene at his own trial which was open to the public. Clad in the same pajamas in which he had jumped over a five-foot wall trying to escape, he feigned fatal infirmity. He sulked and said he would boycott the whole business. Then, he wept and trembled. He threatened suicide; quietly forgetting that he had already threatened a talkathon filibuster. He threatened to leave in disgust and actually started to walk out of the court where he was on trial for life. He threatened a death-fast and ended up the next day wolfing down a whole chicken. He started an argument about Mohammedan theology with his prosecutor and then challenged him to a wrestling match. What more could he do without orchestra and props?

Yes, it will be many a day before the likes of old "Mossy" will cheer the headline hunters. Red-faced Iranians may try to forget him, but the working newspapermen never will. He was the clown of the year!

PLANNING THE CUT-OVER

Continued from page 19

operation and another more important step up from common battery to dial operation, each step requiring careful planning and preparation.

Some cut-overs from common battery to dial operation are routine and uninteresting, with few people witnessing the actual cut-over. In these cases, most of those present are necessary to accomplish the actual physical transfer. Others are lavish as a movie premiere, with bright lights, refreshments, etc. The display, possibly with a description of the various steps over a loudspeaker before and during cut-over, is often considered good advertising and a means of improving public relations.

Often, additional features, such as tables covered with food and drinks, add to the festivities. Frequently, too, flowers adorn the new office. While the above attractions do not help the actual functioning of a system, they do in certain cases add glamour.

Usually, the hour selected for the cut-over is at a time traffic load is

(Please turn to page 34)

FLAWLESS!

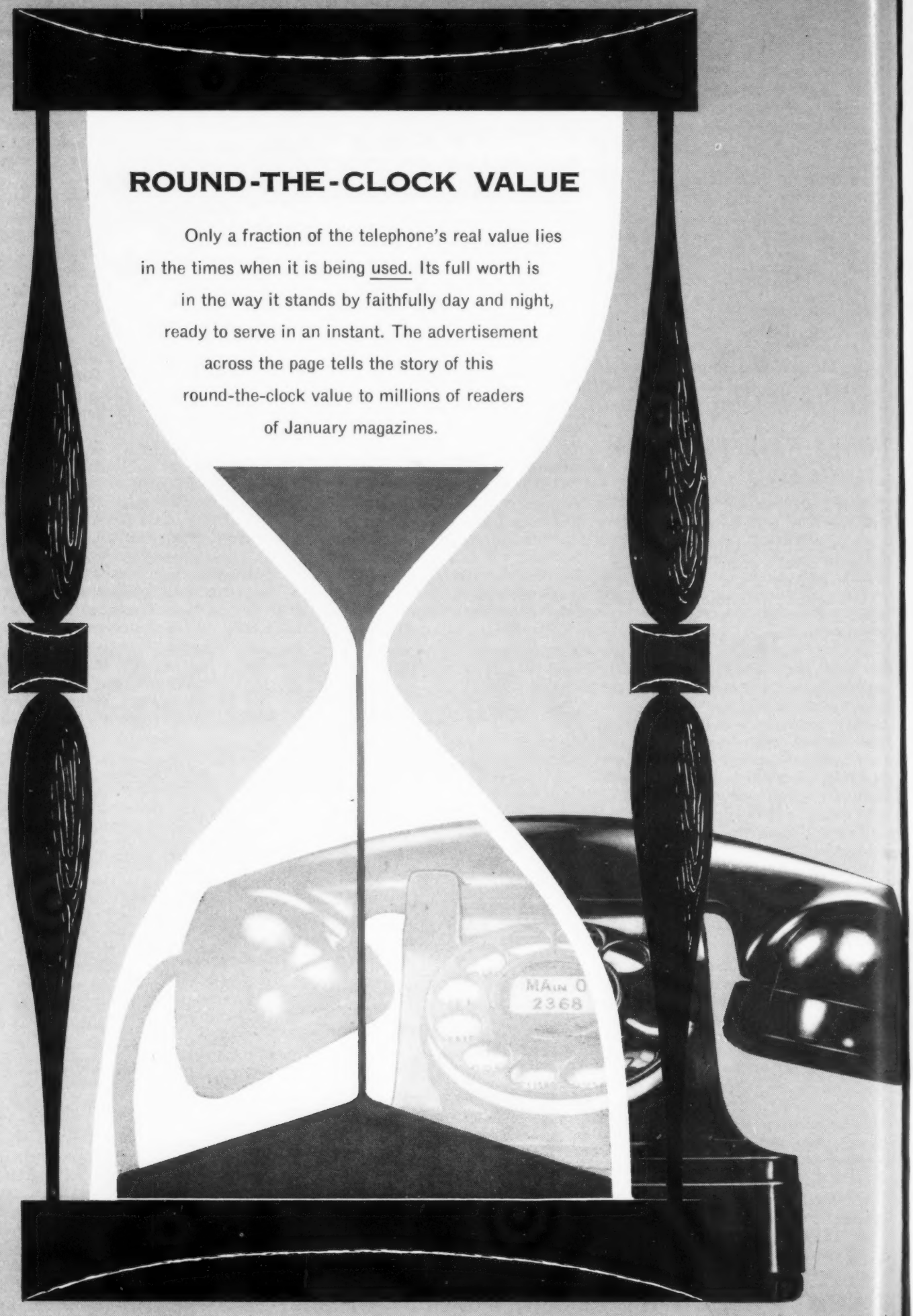
Because consistent high quality and top performance go hand in hand, it pays to specify Armstrong's when you buy glass insulators. They're individually inspected to make sure each one is uniform and flawless. Armstrong Cork Company, Glass and Closure Division, 295 Fifth Avenue, New York 16, N. Y.

ARMSTRONG'S GLASS INSULATORS

for communications . . . for power

ROUND-THE-CLOCK VALUE

Only a fraction of the telephone's real value lies in the times when it is being used. Its full worth is in the way it stands by faithfully day and night, ready to serve in an instant. The advertisement across the page tells the story of this round-the-clock value to millions of readers of January magazines.



A Light Forever Burning

A Voice That Is Never Stilled

Night comes on and spreads a blanket of darkness upon sleeping cities and towns. Here and there a lone policeman. In the distance a clock tolling the hour.

In the dark silence of the night there is one light forever burning . . . a voice that is never stilled. That light is the light in the telephone exchange. That voice is the voice of your telephone. Its very presence gives a feeling of security and of nearness to everyone.

Whatever the need or the hour, the telephone is always ready to serve you—quickly, dependably, and at small cost.

BELL TELEPHONE SYSTEM

LOCAL *to serve the community.* NATIONWIDE *to serve the nation.*

low. This is necessary as, in many cases, it may be essential to reduce the circuits between equipment a short time before and after the physical cut-over. Otherwise, it will probably be necessary to spend a considerable sum of money to install temporary cables and equipment. Some period between Friday evening and Sunday afternoon is usually considered a good time for the cut-over. This makes it possible during the slack period to pick up loose ends, clear trouble and prepare for a heavy load at the beginning of the following week.

An ordinary cut-over may seem to many as a relatively routine accomplishment, but it is actually one of the most important links in a vast world-wide communications system which must be ready at all times to send and receive important messages. Emergency and other vitally important messages must go through without consideration of delays or failures due to certain phases of work that may be in progress at one or more locations in the exchange.

The cut-over procedure is of utmost importance and, as previously stated, should be planned in detail and well in advance. The following suggested plan is offered as a guide for your consideration:

General

(1) A group to be known as the Cut-over Section shall be organized consisting of _____ members, _____ of which shall be furnished from the various units involved. The duties of this section will be devoted entirely to activities associated with the cutover.

(2) The cut-over leader is designated as _____ of one of the units and shall have full responsibility for the successful completion of this work.

(3) The wire chief, commercial representative, installation foreman, cable foreman, and other group leaders, shall furnish information as outlined in this procedure and such other information as requested by the cut-over leader.

(4) The cut-over date shall be designated "C" day and all operations are to be based on this day.

(5) Meetings of all group leaders to be held weekly until cut-over, unless otherwise requested by the cut-over leader.

(6) All discrepancies, troubles, or recommended changes are to be referred to the cut-over leader for action. If problems, that cannot be resolved locally, are presented, they shall be referred to higher authority for necessary action.

(7) During the planning stage, all automatic equipment should be tested and routined per schedule and until line relays are blocked.

The Commercial Representative shall be responsible for the accomplishment of the following operations:

(1) Compile the new telephone directory.

(2) Deliver directory to all subscribers and copies should all be at end location not later than "C" minus _____ days.

The Wire Chief's duties are:

(1) Furnish the cut-over leader with a complete list of number assignments showing the old and new numbers, the old and new cable pairs and directory listing, new line record cards, new cable records, and prints of the new outside plant not later than "C" minus _____ days.

(2) Change number plates on all station sets, placing the new number plates in permanent location and a temporary number plate installed showing present number with instructions when it is to be discontinued. This operation should be started not later than "C" minus _____ days and completed not later than "C" mnus _____ days.

(3) Make complete final tests and inspections of the outside cable plant and the results recorded including troubles and corrective measures noted. These records shall be turned over to the Cut-over Section leader not later than "C" minus _____ days.

(4) Furnish the cut-over leader with a complete list of all special circuits most of which are cut straight through on the MDF not later than "C" minus _____ days.

(5) Furnish the cut-over leader with a complete list of all priority stations such as fire trunks, emergency stations, etc., not later than "C" minus _____ days.

(6) Instruct switchboard operators on new switchboard with assistance of chief operator not later than "C" minus _____ days.

(7) Coordinate with the Cut-over Section leader in the preparation of a detailed plan of the cut-over as to definite personnel assignments to particular operations of the cut-over not later than "C" minus _____ days.

The Installation Foreman shall be responsible for the accomplishment of the following operations:

(1) Furnish satisfactory proof (records) to cut-over leader that sufficient tests of the equipment have been made to insure proper operation not later than "C" minus _____ days.

(2) After acceptable tests of all equipment, line relays are to be tooth-picked not later than "C" minus _____ days.

(3) Furnish extra personnel to the Cut-over Section as requested from time to time starting "C" minus _____ days.

(4) Assist cut-over leader in preparation of a detailed plan of the cut-over as to definite personnel assigned to a particular operation not later than "C" minus —— days.

The Cut-Over Section Leader shall be responsible for the accomplishment of the following operations:

Constructio
With the Doubl
and America
the new cane se
is cooler - cleaner
more comfortable.

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Literally "by request"—this new op
tor's chair retains all the posture ad
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The posture-curved, well-cushioned b
rest is covered in genuine leather.
The exclusive Sturgis "Follow-Flex" f
ture automatically adjusts to the op
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fully all the time, discourages fatig
keeps her at top efficiency.
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available on request. Six seat heights
adjustable.
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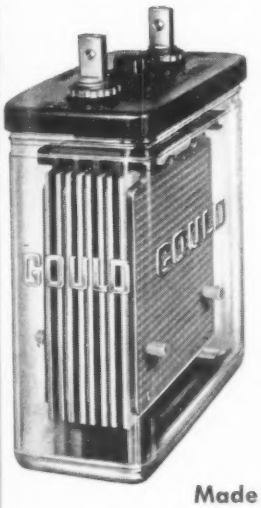

gould planté

For long life and uniform dependable service, no other telephone battery equals the Gould Planté. It has rolled up amazing performance records, remaining in active full-float service for 20 years, 30 years and longer!

In the Planté, *all* of each positive plate is pure lead, containing *no* antimonial impurities. Thus, Gould has eliminated the primary cause of self-discharge, capacity losses and shortened battery life. Planté batteries float at constant voltage and maintain rated capacity all their life. Because they almost never need service, maintenance is negligible. If you would cut battery costs to a minimum, choose Planté.

Made by **GOULD-NATIONAL BATTERIES, INC.**

Mfd. by Cook Electric Co.

something new in sub-station protectors

The Cook type RO-9u Sub-station protector has a rugged all-metal housing in which are mounted the A-9u 7 amp. fuses and the line and surge arresters.

This protector meets all requirements of the Underwriters' specifications and is listed by the Underwriters' Laboratories.

Insulation is of high impact bakelite, and secondary surge arresters furnish high voltage protection when fuses are blown or removed.

revenue-saving *in long-lasting poles is yours when you use*

DIAMOND C POLES

Now better than ever, as made in Colfax Lumber & Creosoting Co.'s NEW plant

All Diamond C poles are carefully selected from trees growing in the heart of the famous Southern Yellow Pine belt. Each pole is graded according to physical properties desired and pressure-treated with 8 lbs. (more, if you want it!) of grade No. 1 creosote oil, per cubic foot of wood. A new and modern treating plant promises better-than-ever quality and faster deliveries.

Have the lowest possible annual pole cost. Specify . . .

DIAMOND C

COLFAX LUMBER & CREOSOTING COMPANY, INC.

Distributed by STROMBERG-CARLSON

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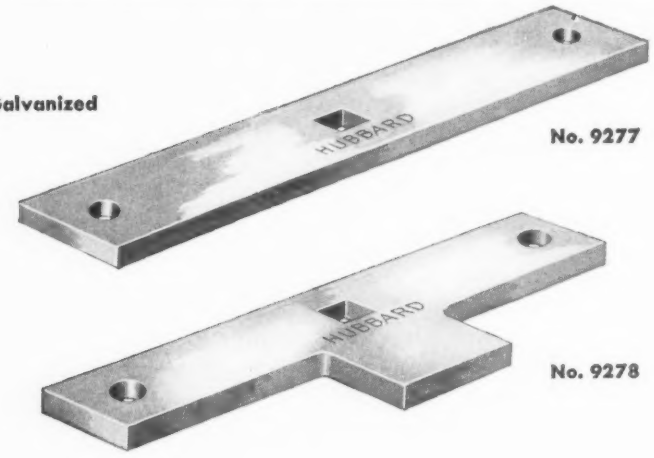
...PMENT AND ELECTRONIC CARILLONS • INDUSTRIAL, INTERCOMMUNICATION SYSTEMS • TELEVISION, RADIOS AND RADIO-PHONOGRAPHS

HUBBARD TANDEM TRANSPOSITION BRACKETS

Hot Galvanized



No. 9277

No. 9278

HUBBARD Tandem Transposition Brackets are universally used by the largest telephone companies in conjunction with transposition insulators. The transposed lines are crossed on a single bracket employing two pins, and mounted above the arm. Brackets are mounted sufficiently loose to swing freely during the operation of transposing the wires, and tightened when the job is finished. Tandem Brackets are normally used in lines having a span length of 150 feet or more. No. 9277 is used on straight lines or those with a "pull" of not more than 15 feet. No. 9278 is used where the "pull' is from 15 to 50 feet.

"Hang the load on Hubbard Hardware!"

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Cable Suspension Material—Wireholders
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Braces—Drive Hooks—Messenger Dead Ends—Extension Arms—Long Span Material—Pins—Clamps—Guards—Stubbing Bands—Guy Protectors—Guy Clamps
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Carriage Bolts—Rings—Transposition Brackets—Eye Bolts—Pole, Corner and House Brackets—Guy Hooks—Strain Plates—Storm Guy Straps—Lags—Machine and Hubeye Bolts—Sidewalk Guys
REA Telephone Hardware

UNDERGROUND

Cable Racks—Manhole Ladders and Steps
Pulling-in Irons—Expanding Anchors
Cable Shields—Screw Steelwing Anchors
Anchor Rods—Ground Rods and Clamps

HUBBARD AND COMPANY
ESTABLISHED 1843
PITTSBURGH • CHICAGO • OAKLAND, CALIFORNIA

(1) Run in cross-connections on MDF, starting not later than "C" minus _____ days and complete not later than "C" minus _____ days, including all changes to this date.

(2) Solder MDF cross-connections starting "C" minus _____ days.

(3) Make a proof-check of all outside cable pairs not later than "C" minus _____ days.

(4) Make a proof-check of the central office automatic equipment, starting not later than "C" minus _____ days.

(5) Install and test all special straight through circuits, such as Western Union and teletype in a permanent manner. Tag each circuit as completed with a special identification. This operation to start "C" minus _____ days and complete "C" minus _____ days.

(6) Install direct telephone lines between the new attendant's cabinet or other satisfactory location and all the satellite offices, at least two to each office, not later than "C" minus _____ days.

(7) Prepare all facilities necessary for cut-over such as lighting equipment, soldering iron, leads, extensions, work benches, etc., starting "C" minus _____ days.

(8) Make up a complete plan in detail for the cut-over procedure, including duty assignments, time schedules, assignment of personnel, method of checking important circuits during or immediately following the cut-over. These plans should be discussed and agreed to by the Cut-over Leader and the Installation Foreman and such plans should be completed by "C" minus _____ days.

(9) Install _____ to _____ additional common battery lines on special tables in the operating room to be used as extra information lines and to remain in service until information traffic drops to a minimum after cut-over. Each telephone location to be provided with sufficient directory information to assist on all calls. The operator for this work should be briefed for quick dispatch of the information requested. This operation to be started "C" minus _____ days.

(10) Test all toll lines, fire trunks and other priority lines for proper operation "C" minus _____ days.

(11) Make a trial run of cut-over procedure with all personnel in place "C" minus _____ day.

(12) Immediately following the cut-over, check all toll lines, fire trunks and priority lines, including key hospital stations and key telephone stations.

(13) Relocate any equipment as required "C" plus —— day.

V V

Sells Texas Independent

The Floresville (Tex.) Rural Telephone Co. recently was sold by S. W. Teas, former president and manager, to W. E. Nunneley and sons, Earl W. and Jerry Nunneley, of St. Jo and Decatur, Tex.

ECONOMIC DEVELOPMENTS

Continued from page 22

trade journals report experimental installations made in cooperation with the REA. In one experiment a single channel carrier system was superimposed on an open wire lead nine miles long, between two towns. At the distant terminal, eight subscribers were connected to the carrier circuit on a party line basis. The physical circuit serves other subscribers along its length and there was no interference between the two types of circuits on this line.

Subscribers connected to the carrier circuit report excellent service. This circuit is quiet, being comparatively free from noise pick up from adjacent power lines.

In another experiment, the same company installed a subscriber radio link between two towns. Simple corner reflector antennas were mounted on existing high structures, separate antennas being used for transmitting and receiving. The airline distance between the radio terminals is 28 miles, about half of which is over water.

The subscribers at one of the terminals were served by an open-wire line in joint construction with a power line. Fully selective ringing is employed through the radio link equipment, though bridged ringing can be used, if desired.

This company reports satisfactory results with the radio link. The equipment and installation cost was low compared with the much higher cost that would have resulted, if a land line had been built.

The REA is also conducting tests in other areas, using another type of telephone carrier equipment which promises to reduce the cost of extending rural telephone service. This carrier equipment will permit one pair of wires to carry as many as six simultaneous two-way conversations. With each channel of the new equipment, up to 10 additional subscribers can be connected to the central office without degrading service on any other carrier channel or the physical wire pair. This means that up to 50 additional subscribers could be added to a single line pair for party line service.

If these tests are successful, it may be possible to economically serve isolated groups of farm families by carrier where previously the telephone company had to turn down requests for service because of overcrowded lines and high construction costs.

Long-Span Construction with High-Strength Line Wires

With the development of carrier and

ALPHADUCT DROP WIRE

carton packaging

saves you time and money

- easier to handle
- easier to inventory
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Once you start using Alphaduct Drop Wire you will find out that the handy carton packaging has real dollars and cents advantages.

Not only does your wire arrive in perfect condition, but the sturdy carton protects it all the while it's in your warehouse.

The cartons are easier to handle than loose coils. They can be stacked higher without danger of falling and the wire on the bottom will not be crushed or bent. Space is saved, inventory taking is simplified, and the possibility of injuries to workers from tumbling coils is removed.

We try to make Alphaduct the finest, longest lasting drop wire money can buy. Quality materials are used throughout, step-testing during every phase of manufacture assures uniform high standards. Alphaduct drop wire is dated with a color coded thread so you can tell for sure how long it lasts.

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You will be the judge! We will send you (on request) a free sample bracket for field trial (transportation charges prepaid). Save on maintenance; send for booklet fully describing the Case Aluminum transposition bracket.

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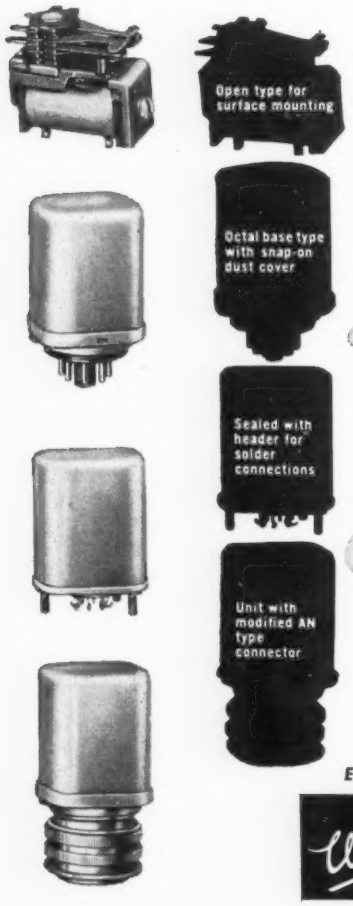
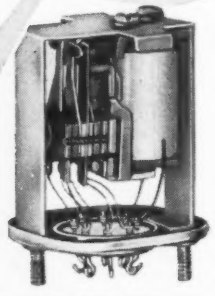

Open type for surface mounting
Octal base type with snap-on dust cover
Sealed with header for solder connections
Unit with modified AN type connector

a rugged little space saver . . .

MIDGET TELEPHONE TYPE RELAYS SERIES (80)—OPEN TYPE FOR SURFACE MOUNTING, OR IN HERMETICALLY SEALED CONTAINERS.



This vibration and shock-proof Midget Type Relay is the answer to numerous applications where unfailing operation is necessary. In fact, it is built to meet rigid Army and Navy specifications. This "rugged little space saver" is a compact, multiple contact relay which has been developed over years of specialized engineering in the field by Signal Engineering and Mfg. Co., manufacturers of a comprehensive line of relays and signals of various designs and sizes.

Write for Bulletin MTR-4

Engineering Representatives in Principal Cities.

Wheelock RELAYS
SIGNAL ENGINEERING & MFG. CO.
LONG BRANCH, NEW JERSEY

microwave systems and the increasing use of cable plant, telephone open wire lines continue to be the backbone of rural telephone systems. For dependable rural party line services, it is difficult to surpass these rural open wire lines for low cost and simplicity.

Where the terrain of the land permits, economies in construction are possible through the use of long-span construction. This is particularly the case in heavily wooded hilly areas where short poles can be placed on high points to enable the wires to span across densely wooded valleys from and to comparatively clear spaces on the hills. Where the wires must be supported through wide valley bottoms, tall poles can be set in these areas.

In the same area, it is possible to build open wire jointly with rural power distribution lines to avoid dense hedgerows or thickets on the other side of the road. Power companies, particularly REA cooperatives or state public power districts, are very strict about keeping their own right-of-way clear of brush. The rental cost is more than offset by the savings in having to place tall poles or remove the brush. Such line construction requires high strength wire on account of the long spans between the power distribution poles. It is also necessary to transpose the wires at every pole to reduce noise induction and to use special 3,000-volt pole protectors at the proposed locations for protecting the telephone line in event of a power wire falling across the open wires.

For long span construction, high-strength wire should be used to avoid excessive sags in the spans which would require the use of expensive tall poles for adequate ground clearance.

Conclusion

New developments in design, materials, or methods should be given careful consideration in telephone construction and maintenance studies. Such studies are essential to the successful management of a telephone company. All factors, such as equipment and installation costs, annual charges, and depreciation, should be weighed against the factors of gain in revenue, salvage of materials recovered, and reduction of labor costs.

V V

"Education makes a people easy to lead, but difficult to drive; easy to govern, but impossible to enslave."—LORD BROUGHAM

V V

"On the diffusion of education among the people rests the preservation and perpetuation of our free institutions."—WEBSTER

MAINTENANCE EQUIPMENT

Concluded from page 27

suitable for a breakdown of the line insulation. Furthermore, due to the excessively high voltage, the station tubes might be seriously damaged and thereby rendered unfit for service.

To obtain reliable ringing at full selective four-party tube relay stations, the spacing between the armature and core of the ringers should be approximately .012 inch, and .060 inch for the biasing spring side as shown in *Fig. 4*. The ringer biasing spring tension should be adjusted to about 15 grams, measured to where the biasing spring is attached to the end of the armature, as shown in *Fig. 5*.

The ringer armature should move freely without binding, and the tapper should strike each gong clearly without resting against either.

(To be continued)

Record-Breaking March of Dimes Needed to Conquer Polio

Hope for the total conquest of polio makes 1954 the "year of decision" for the National Foundation for Infantile Paralysis, its chapters, and the citizens of the nation who have supported the annual March of Dimes.

The 1954 March of Dimes, the most critically important in the foundation's 16-year history, begins Jan. 2 throughout the nation.

A polio vaccine, developed through research sponsored by the foundation

will undergo extensive field tests in the U.S. during the next year, and may prove to be the long-sought answer to the only remaining contagious disease in the nation still increasing and still uncontrolled.

The foundation has directed its attack on polio from three fronts: patient care, research, and professional education. Now a fourth front has been opened—polio prevention.

The new polio prevention program will cost the foundation 26½ million dollars in 1954, over and above the amount needed to carry on the three established programs. This will require greatly increased contributions to the March of Dimes in 1954.

While polio prevention presents a new, hopeful, and costly challenge, care for those children and adults already suffering the effects of polio must continue.

By increasing their contributions through the 1954 March of Dimes, citizens may help ransom future generations from the scourge of polio, and at the same time, continue to provide every polio victim every chance to live the happiest, most useful life possible.

When final victory over polio is achieved, the citizens of the U.S. may be justly proud of the great role they have played in conquering polio through their March of Dimes.

V V

OBITUARIES

W. A. ROSENBAUM, 61, well-known in the telephone industry as division contract manager for the Western Union Telegraph Co., died on Dec. 27 at Fostoria, Iowa, where he had been residing since his retirement on Sept. 4.

Mr. Rosenbaum had completed 41 years of service with the Western Union company at the time of his retirement—a considerable part of which had been devoted to working with Independent telephone companies in connection with contracts involving the handling of telegraphic communications by telephone companies.

He is survived by his widow, Justine; one son, one daughter and two grandchildren.

* * *

P. R. KAUFFMAN, 59, assistant wire chief of the Capital City Telephone Co., Jefferson City, Mo., died in Jefferson City on Dec. 21 after an illness of nine months. Mr. Kauffman had been an employe of the Capital City Telephone Co. for the past 31 years.

He was a member of the Theodore Gary chapter of the Independent Telephone Pioneer Association.

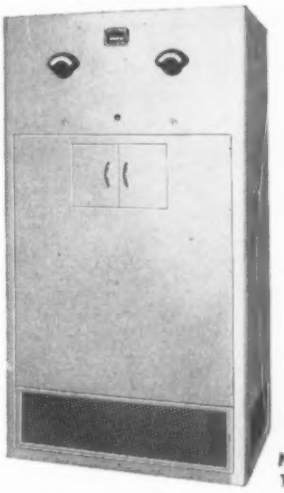
His widow, one son, one daughter, one grandchild, 2 brothers and 2 sisters survive him.

V V

"God gave man an upright countenance to survey the heavens, and to look upward to the stars."—*Ovid.*

FLOTROL

SENSES THE NEED FOR CURRENT



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If you're planning to replace or add to your charging facilities, don't overlook FLOTROL'S many advantages. Write for Bulletin 160 for complete information on single phase models, from 1/2 ampere to 24 amperes, Bulletin 161 describes three-phase models from 25 amperes to 200 amperes.

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MANUFACTURED BY GENERAL INSULATED WIRE WORKS, INC. PROVIDENCE, R. I.

Nike, Anti-Aircraft Device, Engineered by Bell Labs

The first Nike anti-aircraft missile battery, the Army's answer to Russia's future super-speed atomic bombers, will be put in place in the near future at Fort Meade, Md., the Army announced on Dec. 17.

The Nike project was started in 1945 by Bell Telephone Laboratories. The first firing tests started late in 1946. Mass production was started in 1953 by Western Electric Co. at Burlington, N. C.

Long heralded as one of the Army's fantastic weapons that can knock out of the sky bombers that fly faster than the speed of sound, the Nike (named after the Greek goddess of victory) is expected to give the Army's anti-aircraft defense system a new lease on life. Old fashioned anti-aircraft guns cannot effectively deal with modern bombers that can fly 9 miles or more above the earth at speeds of 700 miles an hour.

The Army said the Nike can track and kill an enemy bomber or missile even if the target tries evasive action. The Nike battery at Fort Meade, which will guard the nation's capital and defense installations in this area, is the first use of a missile system to guard American cities against atomic attack.

The Nike, which was shown in films made public also on Dec. 17, is a slim rocket approximately 20 feet long and

1954 CONVENTIONS

Minnesota Telephone Association, Radisson Hotel, Minneapolis, Feb. 1, 2 and 3.

Louisiana Telephone Association, St. Charles Hotel, New Orleans, Feb. 24 and 25.

Kentucky Independent Telephone Association, Phoenix Hotel, Lexington, Mar. 2.

Texas Telephone Association, Texas Hotel, Ft. Worth, Mar. 15, 16 and 17.

Nebraska Telephone Association, Paxton Hotel, Omaha, Mar. 23 and 24.

Ohio Independent Telephone Association, Deshler Hilton Hotel, Columbus, Mar. 29, 30 and 31.

Iowa Independent Telephone Association, Fort Des Moines Hotel, Des Moines, Apr. 6 and 7.

The Illinois Telephone Association, Pere Marquette Hotel, Peoria, Apr. 26 and 27.

Wisconsin State Telephone Association, Loraine Hotel, Madison, May 5 and 6.

United States Independent Telephone Association Executives Conference, Broadmoor Hotel, Colorado Springs, Colo., May 10 and 11.

Kansas-Missouri Telephone Associations (joint convention), Muehlebach Hotel, Kansas City, Mo., May 17, 18 and 19.

Pennsylvania Independent Telephone Association, Bedford Springs Hotel, Bedford, May 25 and 26.

New York State Telephone Association, Scaroon Manor Hotel, Schroon Lake, June 7, 8 and 9.

California Independent Telephone Association, Fairmont Hotel, San Francisco, June 10 and 11.

Indiana Telephone Association, Claypool Hotel, Indianapolis, June 17 and 18.

Oregon-Washington Independent Telephone Associations (joint convention), Multnomah Hotel, Portland, Ore., June 18 and 19.

Michigan Independent Telephone Association, Pantlind Hotel, Grand Rapids, Sept. 9 and 10.

Rocky Mountain Telephone Association, Newhouse Hotel, Salt Lake City, Utah, Sept. 16 and 17.

Arkansas Telephone Association, Majestic Hotel, Hot Springs, Sept. 20 and 21.

United States Independent Telephone Association (annual convention), Conrad Hilton Hotel, Chicago, Oct. 11, 12 and 13.

North Carolina Independent Telephone Association, Carolina Hotel, Pinehurst, Oct. 21 and 22.

South Carolina Independent Telephone Association (hotel unannounced), Myrtle Beach, Oct. 25 and 26.

Virginia-West Virginia Independent Telephone Associations (joint convention), Roanoke Hotel, Roanoke, Va., Oct. 28 and 29.

Oklahoma Telephone Association, Huckins Hotel, Oklahoma City, Nov. 4 and 5.

Alabama-Mississippi Telephone Association, Thomas Jefferson Hotel, Birmingham, Ala., Nov. 8 and 9.

1 foot wide. It has two sets of fins—a group of four small sharp triangular wings near the nose and four large ones near the tail. The missile is launched from a metal rack that slants skyward. The Nike is shot into the air with the help of a rocket booster that falls away after the missile's liquid fuel engines take over. The Army did not disclose the nature of the fuel, but it was believed to be alcohol or hydrazine (a new fuel) with nitric acid or a similar agent that provides the oxygen for burning.

The Nike is believed to be able to reach top speeds of 1,500 miles an hour. It can knock out a plane 35 miles away and 11 miles up in the air.

Unofficial sources said the Nike has an accuracy rate of more than 90 per cent against outmoded, 250-mile-an-hour B-17 Flying Fortresses used in tests. It was indicated that the Nike's radar guidance system, combined with an electronic "brain" computer that controls its course from the ground, would just as unerringly knock out the fastest bombers in production or in experimental development stages. To destroy a bomber 25,000 feet in the air and 10 miles away, the Nike takes 25 seconds or less to climb above the clouds, take an accurate collision course with the bomber, and then follow its quarry with bulldog determination until it runs it down. Destruction of the bomber is virtually complete—according to films of firing tests. The Nike will take its place in the air defense system eight years after its development started.

The Army said the explosive warhead of the Nike will go off only when it is in flight—a protective measure for launching crews. The booster rockets fall into a safety area from which all personnel are barred. The rocket, it was said, explodes harmlessly if it misses its target.

The Nike launching batteries are linked to the Air Force's early warning system and will be assigned to specific areas for intercepting enemy planes. The Air Force piloted planes will operate beyond the effective zone of the Nike missiles.

The Nike batteries will be installed in the underground installations of nine launchers (four to a battalion) or above ground with 12 launchers. The underground batteries will require 24 acres and the above ground 96 acres, including space for launchers, storage, magazines, and housing.

Although the Army refused to comment on the effectiveness or accuracy of the Nike, General Collins, former Army Chief of Staff, told a congressional committee early this year that "when we have a sufficient number of Nike guided missile battalions combined with our other new anti-aircraft weapons and with Air Force interceptor planes, we hope to be able to say that few if any enemy planes will get through . . ."

V V

Urges Review of Manual on Civil Defense Matching Funds

The Federal Civil Defense Administration (FCDA) has issued to its regional directors a revised edition of the Federal Contributions Manual M25-1, according to a recent release by the United States Independent Telephone Association.

The revised manual contains various changes relating to federal-state matching funds for civil defense activities. Recurring charges and installation charges for bell and lights stations for transmitting an alert in principal target cities between key points or control centers and public installations serving police and fire departments, schools, hospitals, waterworks, and offices and homes of key civil defense officials are now approvable, the USITA release states.

Matching funds are also available for installation and recurring service charges for siren control circuits, either wire or radio, and associated facilities under the warning device program. Matching funds are available in the Communications Contributions Program for monthly recurring charges for operational communication services, either wire or radio, in state, area, or community main or alternate control centers and at community zone control centers, at transportation and mobilization points. Charges for basic monthly rental and initial fixed installation charges are approvable but termination charges are not.

Applications from the states for matching funds must be received at FCDA regional offices by Jan. 4, 1954, for the fiscal year July 1, 1953, through June 30, 1954. Federal contributions will be made retroactive to July 1, 1953, but may not be obligated beyond June 30, 1954.

Telephone companies serving civil defense installations should review this matter promptly with their local civil defense officials responsible for programs involving the installation of telephone facilities and equipment, concludes the USITA release.

V V

"Life's problems — obstacles — are not without purpose. They aid the process of self-development, as well as

"PROVING-IN" under 5 miles

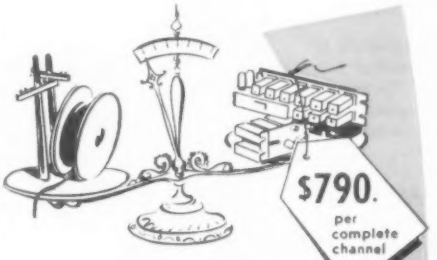
with type 'S'

FM Carrier

Subscriber and Trunk

WHAT DOES IT MEAN?

It means that the cost of one complete (installed) channel of McElroy Type 'S' Carrier is less than the true cost of five additional wire miles, based on national averages!



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If the construction costs of providing an additional wire circuit (subscriber or trunk) on your system exceed $790.00, you can "prove-in" with Type 'S' carrier.

AND THAT'S NOT ALL...

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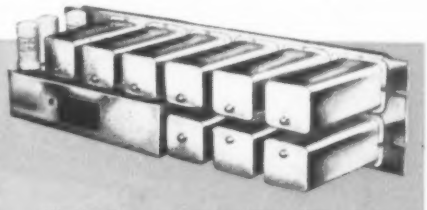
We urge you to review your expansion requirements and invite your "prove-in" calculations and inquiries.



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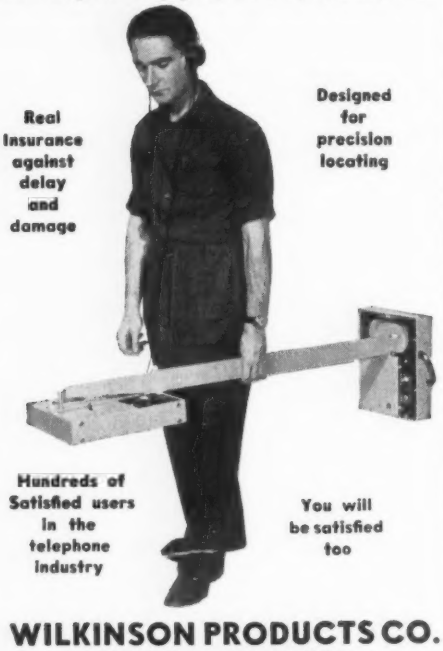
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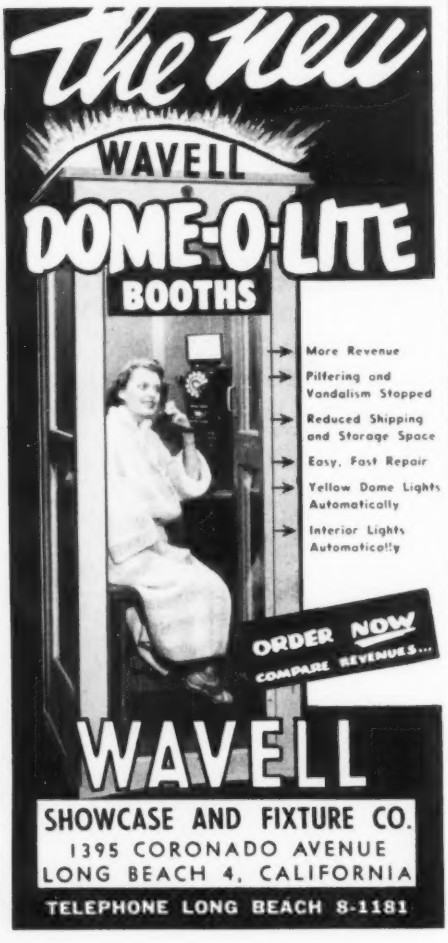

of selection and evolution. They encourage a person to gather new strength and to hurdle the obstacles and to develop his inherent potentialities to their fullest. It isn't an accident that the vast majority of top-ranking Americans, whatever their walk of life, are men whose careers have been associated with hardship and struggle."—LEONARD E. READ, *president, The Foundation for Economic Education, Inc.*

V V

General of Kentucky Announces Organizational Changes

The following organizational changes were announced recently by H. J. Huether Jr., president, General Telephone Co. of Kentucky, Lexington.

Roger L. Lyons was appointed Lexington district manager, filling a newly created post. Mr. Lyons will be in charge of all the operating functions of over half of the company's stations. Mr. Lyons has been general commercial superintendent since May, 1951.

Robert A. Rogosch, Lexington commercial manager, was appointed general commercial superintendent and succeeds Mr. Lyons.

E. S. Blackwell, personnel and purchasing administrative assistant, replaced Mr. Rogosch as Lexington district commercial manager.

B. D. Robertson was named to the vacant post of general equipment supervisor. Mr. Robertson was formerly Lexington equipment supervisor.

Mr. Lyons has been associated with General of Kentucky and its predecessor companies since 1939, serving as draftsman, outside plant engineer and Lexington plant supervisor. Mr. Lyons is a graduate of the University of Kentucky Engineering School and holds the Degree of B.E.E. He is also a registered electrical engineer in the state of Kentucky.

Mr. Rogosch started his telephone career with the Indiana Associated Telephone Corp. (now General Telephone Co. of Indiana, Inc.) in 1945 as general commercial survey field engineer. He also served as district commercial manager at Goshen and Elkhart, Ind., before being transferred to Lexington as commercial manager in 1950.

Mr. Blackwell became associated with the company in 1947 as auditor of disbursements and served as commercial administrative assistant and personnel and purchasing administrative assistant. Mr. Blackwell has over 15 years of utility experience.

Mr. Robertson was employed in 1940 as a central office apprentice and moved up through the ranks to chief switchman and Lexington equipment supervisor.

V V

Michigan Bell Announces Executive Appointments

Herbert F. Lange, who as vice president has headed the personnel department of the Michigan Bell Telephone Co. for nine years, has been named vice president in charge of business research and development, and treasurer of the company.

Succeeding Mr. Lange as vice president—personnel is Harold H. Schroeder who has been an assistant vice president in the public relations department.

Lionel M. Chicoine, who has been secretary and treasurer of the company, continues as secretary with additional responsibilities for various services.

Clifton W. Phalen, Michigan Bell president, in announcing the changes, said that Mr. Lange will head a new department in the company which will be responsible for business research and development studies relating to economic trends and conditions. He also becomes treasurer of the company.

A graduate of Clark University, Worcester, Mass., Mr. Lange has been with Michigan Bell 34 years. He formerly was central division traffic superintendent at Saginaw before going to Detroit in 1937.

Mr. Schroeder, whose father owned and operated a small Independent telephone company in Indiana, has been with the Bell System since 1924, starting with the Western Electric Co. at Indianapolis. A graduate of the University of Akron, he was with the Ohio Bell Telephone Co. and the American Telephone & Telegraph Co. before joining Michigan Bell in 1946. He was named assistant vice president in 1951.

V V

Gustav Hirsch Featured In Company Magazine

Described as a "globe-trotting customer," the Gustav Hirsch Organization, Inc., of Columbus, O., was featured in the December issue of the employe magazine of one of its suppliers, the Graybar Electric Co. The story in the *Graybar Outlook* saluted the Hirsch Organization on the 55th anniversary of its founding and told of its latest job—a major electrical installation at the world's northernmost air base at Thule, Greenland. The Hirsch company installed its first dial system in 1908 at St. Mary's, O., and has been active on electrical, communications and radar jobs in Ethi-

opia, Panama, Alaska, Trinidad and the United States. Gustav Hirsch, founder and prominent telephone engineer, and Milton Staub, vice president of the company, were featured in the *Outlook* story.

V V

Noller Joins Lynch Carrier As Engineering Executive

Walter E. Noller has recently joined the engineering department of Lynch Carrier Systems, Inc., San Francisco, Cal., in an executive capacity. The Lynch corporation specializes in the

W. E. NOLLER

manufacture of carrier telephone-telegraph and associated equipment.

Mr. Noller's previous experience includes assignments with Bell Telephone Laboratories where he was engaged in the design and development of voice-operated devices and fire control radar equipment. He received the Naval Ordnance Development Award as a result of his work.

He subsequently held the position of senior engineer with the Pacific Telephone & Telegraph Co. In this capacity his work included toll transmission, inductive coordination, protection and toll plant extension engineering.

Mr. Noller graduated from the University of California in 1938. He received an M.S. degree from the same institution in 1939. He is a senior member of the Institute of Radio Engineers and is past chairman of the San Francisco section. He is also a member of A.I.E.E.

V V

Horelik Named Field Supervisor For Whitney Blake Company

J. Marshall Taylor, sales manager of Whitney Blake Co., New Haven, Conn., recently announced the appointment of Edward J. Horelik Jr. as field supervisor for the company which manufactures insulated wire and cable and custom built cord sets.

Mr. Horelik will serve as liaison man between the company's New Haven office and its sales representatives located in Chicago, Atlanta, Cleveland, Philadelphia, Kansas City, Dallas, Los Angeles and Los Altos (San Francisco area).

Before his recent appointment, Mr. Horelik was a sales representative for Whitney Blake in New England, New York and New Jersey. A graduate of Rensselaer Polytechnic Institute, he served as airborne radar officer with the United States Air Force for two and one-half years. Before joining the company in 1950 he was a sales engineer in the wire and cable division of United States Rubber Co.

V V

Stanford Institute, U.S. Air Force To Sponsor Symposium

A symposium on the Automatic Production of Electronic Equipment will be held at San Francisco's Fairmont Hotel on Apr. 19 and 20. Joint sponsors are Stanford Research Institute and the United States Air Force.

General chairman of the symposium is L. K. Lee, head of the advanced techniques group, engineering division, Stanford Research Institute.

V V

"The difference between progress and stagnation does not turn on matters that can be regulated by a planner's decrees; it lies deeper in mass psychology." — EDITORIAL STATEMENT, *The (London) Economist.*

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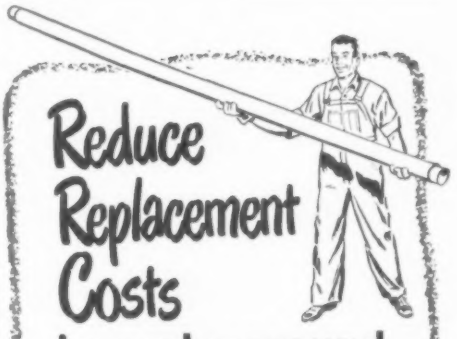

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50 Kellogg No. 1000 Harmonic. A. E. Dials, like new condition.
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Leich No. 90, very clean A. E. Dials. Harmonic. Very reasonable.
Write Public Service Telephone Company of Montrose, Montrose, Mich.

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New WECO F1 Transmitters and HA2 Receivers .....$1.00 each
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New Kellogg 66521 Transmitters and 83B Receivers .....$1.00 each
A. E. Type 50 Telephones with dials.....$14.50 each
New Raytheon Rectifilters output 24 V.D.C. at 1.0 amps.....$50.00 each
Kellogg 4901 WP outdoor telephone with dials $16.00 each—dial blanked $14.00 each
Stromberg-Carlson 1212 desk Telephones with dials .....$10.50 each
WECO 4H dials reconditioned less Esc. plate .....$1.50 each
A. E. Type 38 Handsets reconditioned like new W/3 cond. New cords.....$3.00 each
EE8 army magneto telephones reconditioned and tested .....$18.50 each
North automatic switchboard like new with power supply 30 lines.
WECO 40 type carrier 12 channels tested with power supply.
WECO new 4D and 2L lamp caps $3.00 per 100
New Federal 801BB magneto telephone parts.
New WECO long pole receivers W/HA1 elements .....$1.75 each
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Terms: Check with order
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EASTERN TELEPHONE COMPANY
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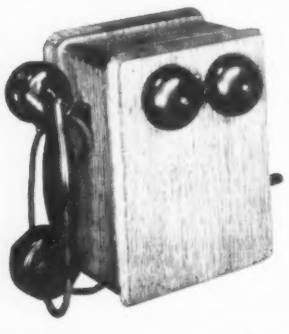
SANI-DIAL, Troy, N. Y.

TYPE "C" MAGNETO HANDSET WALL TELEPHONE



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